

New Zealand Department of Agriculture, Industries, and Commerce.

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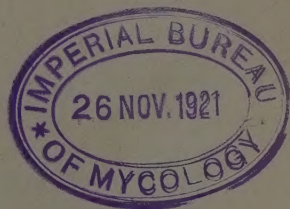
# THE JOURNAL

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## Department of Agriculture.

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PRICE,  
SIXPENCE.

### HERD-TESTING.

*The following paper by Mr. W. Burgess, of Warea, Taranaki, read at the recent Dairy Conference at Palmerston North, is probably the best pronouncement on the important question it treats of that has been made in this country.*

CONSIDERING the very great importance of knowing which cows pay and which do not, it is astonishing so few farmers avail themselves of the absolutely certain means we have at hand—that of weighing and testing—to decide the question. No part of their time could be more profitably employed than that devoted to carrying it out. Without its practice no herd will be entirely composed of good cows; and regular and certain improvement will be impossible, except by purchasing, at a very high price, the best cows to be obtained. By its adoption any farmer may feel confident that his returns will steadily increase, and that, by proper care and the use of a good bull, he will in a very few years be the owner of a herd infinitely superior to the one he now has. New-Zealanders sometimes claim to lead the world, but in this particular direction they are getting left badly behind by some of their competitors. True,

here and there a few have been carrying on the work for a considerable time, and recently the Dairy Produce Division of the Department of Agriculture has been doing good work in establishing testing associations; but instead of the practice being confined to a few it should be universal. As a class, farmers are not inclined to experiment, and perhaps are not to be much blamed for this, as their time is generally too fully occupied in doing work that is fairly certain to make some return to spend much of it in experimenting. But herd-testing has long ago ceased to be merely an experiment: the results from it are as certain as mathematics. The Danes, Swedes, and other of our competitors, by its use, have evolved from very indifferent breeds herds that are giving what would have been thought a few years ago wonderful returns; and if we would not be left behind we have no option but to follow the same practice. With the price of land, labour, and farm requisites all rising, the old style of being content with cows some of which are making good and some very poor returns will no longer suffice. If we are to retain and improve our position we must avail ourselves of every possible means to increase our output and decrease the cost of production. Nothing else will produce so much result in this direction at so small an outlay as regular and constant weighing and testing.

It may appear rather presumptuous on my part to read a paper of this sort before a meeting composed of the leading dairy-farmers and Government experts of the country, but the very fact that the writer is one of themselves—possessing no advantages in the way of training that they do not possess, depending upon dairying for a living, having made considerable improvement in his herd by practising what he is preaching, without having bought a single high-priced cow or heifer, on land of only ordinary quality, and with feed such as any ordinary farmer can grow, may appeal more strongly to the average farmer than an address by a specialist or one who has not had to study cost in obtaining results.

It is by no means unusual to hear a farmer say he does not need scales or tester, as he knows the cows that fill the bucket without their assistance, or that his cows are doing as well as those of other people. But any one who has used the scales and tester soon knows that, without their use, any man may be very far out in his estimate, and that good average herds that have not been tested contain many cows that are not worth keeping. Cows giving a large flow of milk may be found at the end of the season near the bottom of the list, owing either to their short lactation period or to a low percentage of fat, whilst others giving but a moderate quantity may, through persistent milking or a high test, finish the season on top. The idea that the quality of milk can be judged by its appearance is soon dispelled



by the use of the Babcock, which shows it to be a delusion. Nothing but regular and careful weighing and testing right through the lactation period can fix with any degree of certainty the value of cows, but by this means the values can be fixed with absolute certainty. Individual cows may, and do, vary as much as three or four points in test and 20 per cent. in the weight of their milk within a week without any apparent cause, so that an occasional weighing and testing may be quite misleading, and is certainly not reliable.

Cows are not simply machines, taking in a certain amount of raw material and turning out a fixed proportion of the finished article in the shape of milk, but highly strung, sensitive animals, sometimes feeling quite fit and at other times not quite up to the mark. A common belief that cows vary so much from season to season that testing for one season is but of little use is not borne out by an experience of six years' careful weighing and testing. On the contrary, it has proved that individual cows make very much the same returns for a good many seasons when once they have reached maturity. Doubtless when several of them are making fairly equal returns the one that is just on top this year may be second, third, or fourth next year, and so on, but unless there is some very good reason for it, such as late calving or ill health, they maintain about the same relative position in the herd until age begins to tell on them. It may safely be assumed that no successful merchant long continues dealing in articles on which no profit is realized, but uses every effort to increase his trade in those which pay for handling, and the dairy-farmer must work on the same lines if he too would be successful. The wedge-shape, the escutcheon, fine long tail with plenty of brush at the end, the colour of the skin, and numerous other points are regarded by many as certain indications of a good cow. They certainly are of some value in the show ring, and may have some merit as an index to milking-qualities; but all of them are far from being infallible. Then why rely upon them when an unerring guide is at hand?

If personally carried out by the owner of the herd, weighing and testing has much to recommend it in addition to putting the proper value on every cow. Being in the milking-shed, say, morning and evening, on one day in each week, he soon knows how his cows are being handled by the different milkers. Should a sudden shrinkage occur in the output his attention is at once drawn to the fact and the reason for it sought. It may prove to be scarcity of water, being hurried into the yard, or kept in one paddock too long. Whatever the cause may be, when attention is once drawn to it, it can generally be remedied before much harm is done. If any particular cow is far below her usual performance, whilst the others are at about normal, she will be examined at once to see what is wrong. Again, knowing

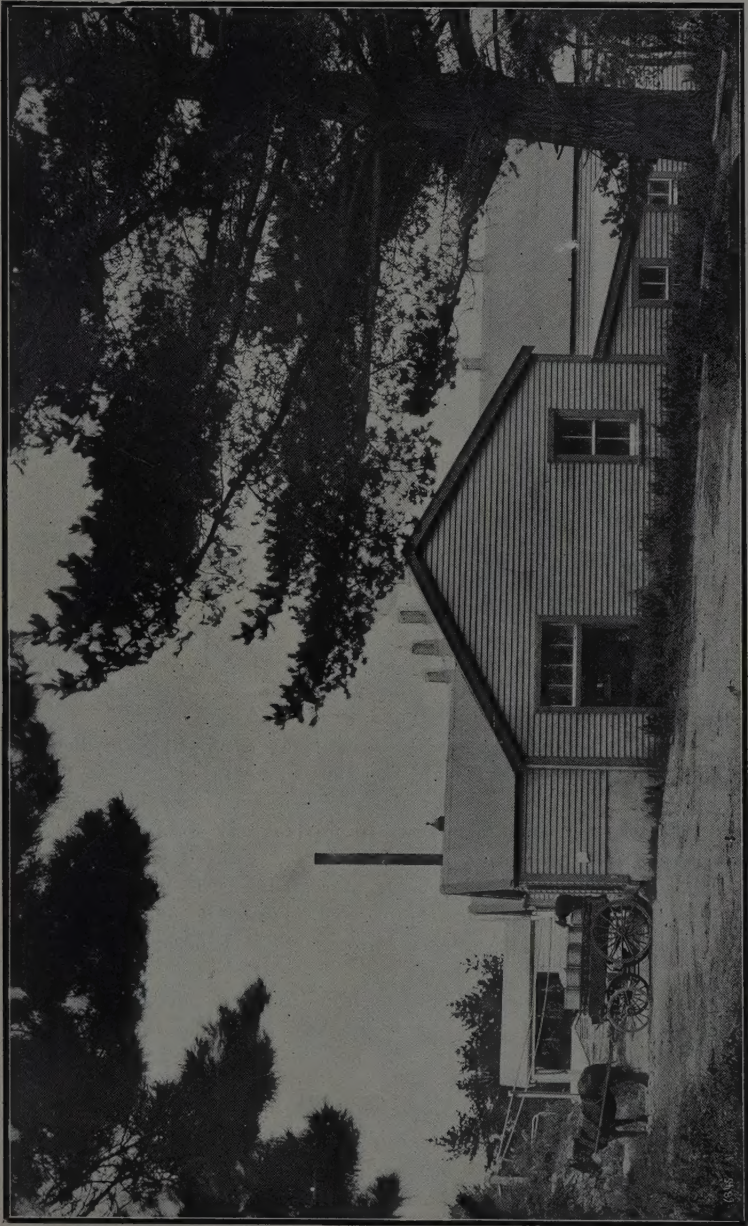
that the production of each cow will be recorded by the owner creates a healthy rivalry amongst the milkers to show the best results from the cows milked by them, which certainly tends to better milking being done. These side-issues alone would be worth most of the time and the very small expense necessary to carry on weighing and testing.

In our Courts of justice hearsay evidence is regarded as of little value, but much importance is attached to the evidence of a witness who has seen or heard what he is giving evidence upon, so perhaps it may be pardonable to relate my own experience of weighing and testing. Six years ago the writer of this paper had a conversation with the Secretary of the National Dairy Association, Mr. J. G. Harkness, on the subject of this paper, and was so convinced of its importance that the necessary apparatus was soon after obtained. During the following season the milk of each cow was weighed and tested morning and evening on sixteen days throughout the milking-period. The results were a revelation. The herd consisted of thirty ordinary cows, and neither the milkers nor the owner had any idea that there was any great difference in their value, yet when arraigned in order of merit at the end of the season and a line drawn through the centre of the list, those on top of it averaged 50 per cent. more butter-fat than did those below it, whilst four cows produced twice as much each as did twelve of those at the bottom of the list, and this in spite of the supposed worst cows having been freely turned out at the end of each milking-period, whilst the average output was quite up to of that the neighbourhood. At the end of the season eight of the worst cows were culled out and replaced by five cows and three heifers bought at clearing sales in the neighbourhood. From then till now (a period of five years) the milk of each cow has been weighed and a sample taken for testing at the morning and evening's milking on one day in each week right through the lactation period.

#### COST OF THE WORK.

	£	s.	d.
Capital outlay, say £10 at 10 per cent. ..	1	0	0
Acid 1 gallon, three-quarter bottle tabloids (2s.) ..	0	5	4
Four hours per week for fifty weeks weighing, at 1s. 10 0 0	10	0	0
Five hours each for twelve testings .. ..	3	0	0
	<hr/>		
	£14	5	4
	<hr/>		
Thirty-two cows tested, average per cow ..	£0	8	11

None of the records extended over more than twelve months; the average length of time was forty weeks.



THE FACTORY OF THE WAREA CO-OPERATIVE DAIRY COMPANY, OF WHICH MR. W. BURGESS HAS BEEN CHAIRMAN FOR MANY YEARS.



A spring balance, with dial face, and the index hand set back to allow for the weight of the bucket, is suspended at that end of the shed nearest the milk-stand. Close by, on shelves, stands a sample-bottle labelled with the number against which each cow is entered on the list, and a sheet on which the weights are entered, whilst a dipper to contain the quantity of milk required for testing purposes hangs on a nail ready to use. Each milker brings the milk of one cow at a time immediately it is drawn. This is placed on the scales, and the weight of milk entered against the name of the cow giving it, while the required quantity for testing purposes is put into the right bottle. The whole process causes but a very slight delay in milking, probably not more than two minutes for every ten cows milked. At the end of every four weeks the samples are tested and the tests entered against the names of the proper cows. The results are easily worked out whenever convenient. It would surprise many of those who have never attempted it to find how interesting the work becomes; so that very soon one begins to look upon it as no task, but a pleasant and very profitable way of employing time. In 1906-7 the work, of course, resulted in nothing but finding out the real value of the individual cows. The average production of butter-fat for this season was 198 lb., and it had taken six years of heavy culling, without the aid of scales and tester, to reach this, although only three of the herd were first calvers.

Experience had taught the unreliability of cows that could be bought, and it was determined to attempt breeding up, so a pure-bred Ayrshire bull, of fairly good milking strain, was bought from the Department of Agriculture to start the next season with.

As a result of weeding out the worst cows the average production of butter-fat rose to 222 lb. for the 1907-8 season, a gain of 24 lb. for each cow, or 720 lb. for the thirty. This surely should encourage those who think it will take years to produce any result to start at once, seeing what even one year at it will do. True, it will take years to build up a first-class herd capable of reproducing its good qualities, but the first year's operations are a step towards it, and if followed up will certainly lead to ultimate success, whilst handsomely repaying the trouble almost from the start.

The average production of butter-fat for the next season was 234 lb., an increase of 12 lb. per cow, notwithstanding that six were first calvers as against three in the previous season. At the end of this season (1908-9) only two cows were turned out, and six heifers, bred on the farm from the best cows, were brought in. During the 1909-10 season the thirty-two cows milked returned an average of 241 lb. of butter-fat. This increase of only 7 lb. per cow over the previous season may appear small, but taking into consideration that



the heifers are brought in at two years' old, and that there were six of them in the herd together with six that had only been brought in the year before, the result was not unsatisfactory. Having now raised the standard to at least 220 lb. for any cow that was to be retained, seven that did not come up to it were culled, and one of the best got accidentally killed. Six heifers from the best cows were again brought in, and a fresh Ayrshire bull with high milking records for his dam and grand-dam was procured.

During the 1910-11 season thirty cows were milked, and for the first time there was a decline in the output. This was not due to any tendency to deteriorate, but solely to the scarcity of water and absence of succulent food caused by the very dry summer, for which adequate preparation had not been made. This fact will be shown by the figures for the season just ended. Three cows were this time culled, and five heifers, bred as before, were added. For the season just ending thirty-two cows were milked for an average return of 261 lb. butter-fat. This shows an increase of 63 lb. of butter-fat for each cow since testing was started six years ago. Some lessons taught by the scales and tester have been: That it is impossible to gauge with any degree of certainty the value of individual cows without their use; that a cow which is a persistent milker with a fairly high test, although giving but a moderate amount of milk at each milking, generally comes out on top; that a heifer brought in at two years old seldom reaches her best until the fifth or sixth time of calving; and that a large proportion of good cows, although of no particular breed, if put to a purebred bull of good milking strain, produce good heifers.

There can be no doubt that culling without weighing and testing is doing work very much in the dark, and that cows are sometimes turned out that are better than are many of those retained. In order to improve the herd a large proportion of heifers from the best cows have been bought in each year. Of course, for the time being this considerably reduces the average output, as two-year-old heifers do well to produce two-thirds as much as a cow in her prime, but in a few years the necessity for introducing so many will have passed away, and the output may be confidently expected to increase largely. But in spite of this drawback the annual increase of production is making a handsome return for the time taken up, and at the same time laying the foundation for something much better in the future. The average test for the herd, as shown by the factory-manager, for 1910-11 was 3.93, whilst that shown on the farm was 3.91 (a difference of just over  $\frac{1}{2}$  per cent.), which shows that the work can be carried out with a fair degree of accuracy under ordinary farm conditions. The slightly lower test on the farm than at the factory is probably due to the former being taken in an ordinary shed, where the fat-column shrinks rapidly when the weather is cold, whilst the testing-room at the factory can be kept at a fairly high temperature. As an excuse for not follow-

ing the practice, it is sometimes said that if all were to do so it would be impossible to replace the large number of cows turned out by better ones. But even in a good average herd some cows will be found that are being kept at an absolute loss, and were they culled without being replaced it is quite probable that those remaining, owing to better feed and attention, would make a bigger gross return than the whole did previously. Still, if one is determined to keep up his number, heifers can be bought at any ordinary sale that will in three cases out of four make better cows than the worst to be found in the herd. The most certain way to improve is to save heifers from the best cows by a good purebred bull of milking strain and replace the culls by these. Of course, it may be contended that this method, if it were adopted, would reduce the number of cows that could be kept, and therefore the output of milk. If no improved methods of farming were adopted the first part of the contention would be valid; but it by no means follows that the output would decrease. Cows under healthy conditions will milk at least eight seasons, and in cases as many as twelve or more, before getting much past their best. During the six years that records have been kept the annual increase per cow according to the number of calves she has had has been 16 per cent. for second over first, 12 per cent. for third over second, 5 per cent. for fourth over third, and 3 per cent. for fifth over fourth. For the sixth and seventh neither increase nor decrease was shown, whilst in the case of three with the eighth calf two increased and one decreased, of two with the ninth one increased and one decreased, one with the tenth decreased, and one with the eleventh decreased, but even in the case of the oldest was producing more than at the third calving. Two others whose age is not known, but which must have had at least twelve calves, are still profitable. Taking eight seasons as the average, then heifers equal in number to  $12\frac{1}{2}$  per cent. of the cows must be kept each season; and, allowing that they are brought in at two years old, this would involve keeping on the farm heifers equalling in number 25 per cent. of the cows. But as they would only average about seven months of age in the early spring, when feed is of most importance, it may safely be assumed that they would not require more feed than would suffice for 12 per cent. to 13 per cent. of the cows.

The figures previously given show an increased production of about 12 per cent. as the result of the first year's testing—enough to pay for all the decrease caused by keeping all the heifers necessary. If the results for six years are taken it shows that the heifers can be kept and still there will be 16 per cent. more milk to dispose of. Those who rear heifers from the best cows by a good bull will gradually but certainly build up a herd that will pay handsomely. Should this method be adopted there will be some cows to dispose of every year, nothing to spend in buying cows, and the risk of introducing diseases which may prove disastrous will be



SUNFLOWER 4TH (606), A MEMBER OF THE JERSEY HERD OF MR. H. E. B. WATSON, OF TAITAPU.

Twelve Months Record—14,125½ lb. of milk. Authenticated six days' test, 103 days after calving—397.12 lb. of milk, and 15.11 lb. of butter-fat.



largely avoided. A far less sum than the increase in receipts resulting from weighing and testing spent in extra manures and cultivation will enable as many cows to be kept as well as providing feed enough upon which to rear heifers. By doing this the fertility of the land would be increased instead of gradually but surely decreased, as is taking place in too many instances, whilst the farmer would benefit himself and the whole country, and be a far more useful member of the community than the mere soil-robber. He who makes two blades of grass grow where but one grew before has been described as a benefactor to humanity. How much more must he be a benefactor who not only produces the two blades but uses each to far better purpose! Factory-managers accustomed to work on scientific lines would be delighted to see suppliers doing the same, and would gladly give lessons in testing, so that any farmer of ordinary intelligence would have no difficulty in learning how to do it. In some of the leading dairying countries, the almost universal adoption of the practice has had wonderful results in increasing the output, although originally the dairy cattle were of no particular value; and if the dairy-farmers of New Zealand would but follow their example the increase in output would completely put in the shade that which has been made in the past, great though that admittedly is. The possibilities are enormous. The present output, variously estimated to average from 160 to 180 lb. of butter-fat for the whole Dominion, could easily be increased to 240 lb. in a very few years, and soon 300 lb. or more could be looked for with confidence. What this would mean to farmers and the whole Dominion can hardly be imagined. Some testing associations and a few individual farmers are keeping records, and this undoubtedly is a good thing for the industry, but something more than this is wanted. In the case of associations the owner of the cows or an employee takes the samples and weights, which are forwarded to the officer of the Department to be tested and the returns made up. The man who takes the samples and weighs the milk practically determines what those returns will be, so that if he wishes to advertise his herd he has a ready way of doing it. The same applies to individual farmers. No doubt a very large majority are doing the work conscientiously, and are quite certain that their records are accurate, but some method of putting a hall-mark on them is required, so that a buyer when purchasing may feel fairly certain that he gets what he wants. If this could be done the grading-up could be carried on with much more certain results, and progress would be much accelerated. In the majority of cases where testing is being carried on the milk is being delivered to a factory where records of the weight and test of the milk are kept. Would it not be possible for an official of the Dairy Department to pay an occasional visit at milking-time to the sheds of those who are weighing and testing, weigh and test the milk, compare the results with those credited by the owner to individual cows, then compare the totals as

shown by the owner and the factory, and finally get the total for the season from each to compare? If (after allowing for the quantity of new milk used for calves and domestic purposes) the results are tallied, there would be convincing evidence that the records were correct, and a certificate to that effect could be issued. This hall-marking, whether done by the Department, the National Dairy Association, or the agricultural societies, if properly done, would benefit the industry to perhaps as large an extent as anything yet done by any of them.

A point that deserves the consideration of agricultural societies in dairying districts is whether the time has not arrived to introduce classes at their shows in which nothing can be entered except cows with a milk record or bulls and heifers descended from cows with a milk record. Probably the entries would be very few to start with, but the demand for such a class of stock by progressive dairy-farmers, and the price they would be ready to pay for it, would soon induce breeders to qualify for entry. Phenomenal records produced by extravagant feeding, regardless of cost and regardless of its effect upon the constitution of the animal and her reproductive powers, can scarcely be considered of any general benefit. Neither can those produced through extending the lactation period over more than one season, and in awarding prizes only those records made in not more than twelve months, and under such conditions as are practical, should be taken into consideration.

Too much importance has hitherto been attached in the show-ring to points that imply no monetary return and too little to those that are really essential. Capacity for production combined with strong constitution cover pretty well all the commercial side of the question, but if those which appeal to the sense of the beautiful can be added so much the better; still, they can scarcely be regarded as of anything like the same importance. Proper rearing of heifers, easy access to water, frequent change of paddocks, a supply of succulent feed for dry weather, the provision of winter feed and shelter from the cold wind, quiet handling, thorough milking, and a good bull are all big factors in producing large returns, but without weighing and testing will fail to produce the result they should, and, in fact, be to a large extent wasted.

Weighing and testing is to the farmer what proper book-keeping is to the merchant, and without it he can never be certain what return he is getting for expenditure. In order to protect purchasers of cows proposals have been made that all cows turned out after testing should be branded as useless. The motive prompting this proposal is admirable, but if carried out might act in quite a different way to that intended. From herds that have been long tested cows are being turned out that would yield 40 per cent. or 50 per cent. more than the average cow that has not been tested, and it would certainly not help those beginning to grade up to have these branded as worthless. That something should

be done to protect the buyer from vendors who would foist upon him cows that are of no use may be admitted. Possibly compelling the vendor to produce the record, or having it branded on the cow, might meet the case. The records without taking into consideration the circumstances under which they have been made are scarcely sufficient to establish the actual value of cows. Probably cows that average 240 lb. of butter-fat on land that will carry only a cow to  $2\frac{1}{2}$  or 3 acres would average 280 lb. on land that would carry one to 1 acre or  $1\frac{1}{2}$  acres. It can hardly be expected that so big a return will be made where most of the time is employed in finding sufficient food as where cows can rest a large part of the time. It is not a few record-breaking cows, kept under exceptional conditions, that are going to raise the output of this Dominion (or any other country) to its highest, but the persistent grading-up by the use of scales and tester will do it, and every owner of a herd can do his part in a work which would place dairying in a position such as few can realize.

The dislike that many have for pure breeds of dairy cattle is rather difficult to understand. We have three leading breeds of cattle that have been developed by many years of careful selection for the special purpose of milk-production under very different circumstances. The Jersey has been reared in a mild climate on small areas, intensely cultivated, and has been carefully tended; the Ayrshire originated in a more rigorous climate, and had to range over a wider area to obtain sufficient food; whilst the Holstein comes from a country of low-lying fields, where the growth is luxuriant and succulent. Amongst these breeds it should be possible for any farmer to find the foundation of a herd to suit his conditions; and it does not appear the shortest road to success to ignore the advance made and start building up again from the bottom. First crosses are often excellent, but unfortunately one cannot stop at the first, and when it comes to the second or third nothing is certain except that a large proportion will be useless mongrels. In comparing the records of different breeds, in order to arrive at a conclusion as to which of them will give us the best return, several other things beside the total production of butter-fat need consideration. A particular breed on luxuriant feed may make better returns than another. Put them on rather scanty feed and the position may be reversed. Or, again, some breeds may consume much more than others, and possibly, though making a bigger individual return, may be paying no better. Many things of this sort may affect the issue, but the majority of farmers could not possibly work out these points with any amount of satisfaction, and it is here that experimental farms might be of great benefit to the industry. Almost any supplier to a dairy factory who knew that an avoidable waste of 10 per cent., or even half of 10 per cent., were



going on there would express his feeling pretty strongly, and rightly so, and yet will allow a waste of anything up to 50 per cent. to continue in the produce of his cows rather than check it by the use of scales and tester. This appears very much a case of "straining at a gnat and swallowing a camel," and certainly not good business, when even with a small herd the total annual cost of the work, if done on one day in each week right through the season, and payment for all time put in allowed for, would not exceed 8s. or 9s. per cow, and in the case of large herds much less, whilst the return, even after the first year, would almost certainly be enough to pay the cost three or four times over. Anything that will pay three or four hundred per cent. on the investment is surely about as good an investment as is likely to come our way, and any who do not think it sufficiently good are to be envied for the extremely profitable way in which they have found opportunities for investing the whole of their time and capital, or pitied for the inertia that prevents them from making use of it. The details given above relate to the grading-up of a small herd of mixed breeding, but it must not be assumed that the writer considers this the best way of working. Pure breeds perpetuate their qualities with much more certainty than crosses, and doubtless much better and more permanent improvement would result from using them; but the difficulty at present is the small number that can be found with good records well authenticated. When such are to be found the work of grading up by the use of scales and tester will become comparatively easy.

As no unnecessary difficulties should be placed in the way of beginners, just a word or two here about the apparatus for testing on the market may not be out of place. Test-bottles with narrow necks and wide necks, correctly and incorrectly graded, some heavier and some lighter than others, are to be found, and cause considerable trouble to the novice. The same applies to pipettes and acid-measures. Of course, when the stamp is on them the proper grading is guaranteed, but why allow a lot of not merely useless but misleading stuff to be sold? About the weight and size of test-bottles there is no guarantee, and their variations in these particulars cause considerable vibration in the testing-machine, thereby injuring it and to some extent interfering with the test.

In conclusion, this paper was written with no intention of advertising the merits of the writer's herd (many in this room doubtless own far better), but simply to show by facts and figures, for the accuracy of which he can vouch, what can be done under conditions within the reach of all. If it helps to induce any to start weighing and testing its object will have been attained, and the writer will feel proud to have taken a part (however small) in a movement that is certain to be of the greatest benefit to the dairying industry of the Dominion.

## CULLING THE HERD.

### AN EXPERIENCE OF THE SALEYARD.

W. M. SINGLETON.

THE accompanying illustration shows some cows, the rejects of one of the herds, being tested in one of the cow-testing associations. The owner of this herd has not depended upon calves from his own herd, reared on his own farm, for the upkeep of his herd. Practically all these have come from the saleyards, and on being tested have been found wanting, and were therefore discarded to be fattened and relegated to the butcher.



Some of these animals have interesting records—interesting from the viewpoint of the onlooker, but discouraging from that of an owner. These cows were on good land—some of the best in the Dominion; and yet their production has been so low that some have been culled after producing as follows:—

Number of Days.				Pounds Butter-fat.
114	..	..	..	49-80
102	..	..	..	41-92
89	..	..	..	44-48

And so on. So far as we can ascertain, none of these have been producing up to 1 lb. of fat per day when the average cow was doing better than this, and some good cows were producing as much as 2 lb. of fat daily.

The owner has now purchased a purebred bull of a distinctive dairy breed, and declares that he is out to save calves from his best cows, and will endeavour to build up a herd in this manner. It is the only safe way to make true progress, and, although it seems a slow method, there will be that evidence of progress year by year which the saleyard method can never afford.

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In the first year of the milk-record movement of Scotland the tests of 1,342 cows were dealt with. In the ninth report, recently issued, the records of 13,965 cows were dealt with, so that the movement has expanded more than ten times in the nine years.

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The fact that the percentage of lime in milk did not alter is not remarkable, for the cow (or any other animal giving milk) is known to draw lime from her own skeleton if necessary, and this may even go so far as to cause the bones to become brittle.—*Orla Jensen*, Copenhagen.

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He who has ever experienced the satisfaction, the joy, and the exaltation arising from independent thought, independent action, and independent work, and who has understood his calling aright, will refuse to leave to others the most important work, and will decline to make himself dependent upon outsiders.—(*Benno Martiny* speaking in support of the farmer testing his own herd as against joining a herd-testing association.)

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A YOUNG MEMBER OF THE HOLSTEIN HERD OF THE WERAROA EXPERIMENTAL FARM :  
A DAUGHTER OF DOMINO III.



## CRESTED DOGSTAIL.

A. H. COCKAYNE.

DURING the past season 43 samples of dressed crested dogstail (*Cynosurus cristatus*) have been tested for germination and 39 samples for purity. The 1912 crop of crested dogstail has been the largest on record, and that from the Manawatu district has been estimated at over 200 tons of dressed seed. The season has not been a good one for harvesting grass-seed, owing to the large amount of broken weather, but this does not appear to have had any effect on the quality of the dogstail-seed. The colour is not as bright as is usual in the case of New Zealand seed, but this characteristic does not appear to be of much value in determining the capability of germination. Light-coloured samples were in the main of lighter bushel weight than the darker coloured ones, and their germination energy was weaker. The ultimate germination capacity of both light and dark seed was very high when compared with European standards. The bright-coloured seed was evidently harvested before it was fully matured, and this accounts for the bushel weight being lower than was the case in the darker-coloured ones. The bushel weight has varied between 33 lb. and 38 lb.

## GERMINATION.

The germination of the 43 samples tested has varied between 81 and 100 per cent., while the average was 93.5 per cent. 3 samples germinated 100 per cent.; 10 samples germinated between 96 and 99 per cent.; 15 samples germinated between 93 and 95 per cent.; 9 samples germinated between 90 and 92 per cent.; 4 samples germinated between 87 and 89 per cent.; 2 samples germinated between 81 and 86 per cent. The mean average of 93.5 per cent. is extremely high, the average for European seed being not more than 83 per cent.

## PURITY.

All the 39 samples analysed yielded less than 1 per cent. by numbers of extraneous seeds. The samples, with the exception of two were from the Manawatu district. The impurities noted and their relative frequency were as follows:—

1. Suckling clover (*Trifolium minus*) occurred in 35 of the samples.
2. Catsear (*Hypochaeris radicata*) occurred in 33 of the samples.

3. Shelled fog (*Holcus lanatus*) occurred in 30 of the samples.
4. Catchfly (*Silene gallica*) occurred in 27 of the samples.
5. Sweet vernal (*Anthoxanthum odoratum*) occurred in 26 of the samples.
6. Hair-grass (*Festuca bromoides*) occurred in 20 of the samples.
7. Sorrel (*Rumex acetosella*) occurred in 20 of the samples.
8. Perennial rye-grass (*Lolium perenne*) occurred in 20 of the samples.
9. Prickly sowthistle (*Sonchus asper*) occurred in 18 of the samples.
10. Australian linseed (*Linum marginale*) occurred in 15 of the samples.
11. English hair-grass (*Aira praecox*) occurred in 14 of the samples.
12. Mousear chickweed (*Cerastium vulgatum*) occurred in 13 of the samples.
13. Hawkweed (*Crepis capillaris*) occurred in 10 of the samples.
14. Scarlet pimpernel (*Anagallis arvensis*) occurred in 7 of the samples.
15. Rib-grass (*Plantago lanceolata*) occurred in 7 of the samples.
16. Sowthistle (*Sonchus oleraceus*) occurred in 4 of the samples.
17. Cocksfoot (*Dactylis glomerata*) occurred in 4 of the samples.
18. Toad-rush (*Juncus bufonius*) occurred in 4 of the samples.
19. Hawkbit (*Leontodon hispidus*) occurred in 3 of the samples.
20. Short hair-grass (*Aira caespitosa*) occurred in 2 of the samples.
21. White clover (*Trifolium repens*) occurred in 2 of the samples.
22. Buttercup (*Ranunculus parviflorus*) occurred in 2 of the samples.
23. Timothy (*Phleum pratense*) occurred in 1 of the samples.
24. Italian rye-grass (*Lolium italicum*) occurred in 1 of the samples.
25. Kentucky blue-grass (*Poa pratensis*) occurred in 1 of the samples.
26. Alsike (*Trifolium hybridum*) occurred in 1 of the samples.
27. Hop-trefoil (*Trifolium procumbens*) occurred in 1 of the samples.
28. Californian thistle (*Cnicus arvensis*) occurred in 1 of the samples.
29. Mousear chickweed (*Cerastium viscosum*) occurred in 1 of the samples.
30. Dock (*Rumex crispus*) occurred in 1 of the samples.
31. Cranesbill (*Geranium dissectum*) occurred in 1 of the samples.
32. Oxeye daisy (*Chrysanthemum leucanthemum*) occurred in 1 of the samples.
33. Sand clover (*Anthyllis vulneraria*) occurred in 1 of the samples.
34. Nipplewort (*Lapsana communis*) occurred in 1 of the samples.
35. Selfheal (*Prunella vulgaris*) occurred in 1 of the samples.

The last six impurities were all present in the same sample, and the absence of certain of the impurities characteristic of Manawatu seed indicates that it was of foreign origin. The Californian thistle noted in one sample was quite immature and incapable of germination. Ergot (*Claviceps purpurea*) was present in a small percentage of the samples examined.

Two of the seeds almost invariably present in New Zealand crested dogstail are suckling clover and shelled Yorkshire fog. Both these impurities are of commercial value, and are recleaned by seed-dressers, and an allowance, sometimes covering the whole cost of cleaning, is made for them. These seeds, which are not saleable in New Zealand, find a ready market in Europe at a price that amply repays for their dressing. Suckling clover is sometimes sown in other countries, and, being often of a beautiful golden hue, is frequently used to adulterate poor and dark-coloured lines of white clover, while Yorkshire fog is regularly sown as a pasture-grass, especially in wet sour soils.

From the above it can be seen that certain seeds appear with great frequency in New Zealand dogstail, and are therefore indicative of its local origin. Stebler has designated those impurities which indicate the origin of seed "source-indicators." Other impurities, not so reliable, but which are frequently found in seed from certain localities and are also found elsewhere, he terms "companion seeds."

I look upon Australian linseed (*Linum marginale*) as a source-indicator for New Zealand dogstail. It occurs only in New Zealand and Australia, and, as no crested-dogstail seed is produced in Australia, the presence of Australian linseed must be an infallible indication of the local origin of dogstail-seed. I also consider that shelled Yorkshire fog, suckling clover, catsear, catchfly, sweet vernal, and hair-grass can be looked upon as companion seeds as far as Manawatu dogstail is concerned. A small amount of dogstail is also grown in the South Island, notably in the vicinity of Gore, but sufficient samples from that locality have not yet been examined to enable me to determine whether there are any reliable source-indicators for southern seed.

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In less than two years the number of institutions reporting students in agriculture in the United States has almost trebled. From a total of 864 in such institutions in 1910 the number has now increased to 2,546, an increase at an average rate of 76 institutions a month. Schools teaching elementary agriculture are not included in this list.

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CATTLE ON PASTURE AT RUAKURA FARM OF INSTRUCTION.



## H E L I A N T H I .

## COMPARED WITH THE JERUSALEM ARTICHOKE.

A. W. GREEN.

SOME two years ago much was said and written in favour of the new plant helianthi, both as a forage and a tuberous plant. Now that it has become better known and its real value tested to a greater extent, one is inclined to give it only secondary consideration in comparison with another plant of the same order—namely, the Jerusalem artichoke.

The Jerusalem artichoke (*Helianthus tuberosus*), a native plant of Brazil, is certainly not properly appreciated, probably on account of its uneven shape and size, which leads to an inevitable waste in preparing it for culinary purposes. The main reason of the small size generally grown is due to careless cultivation, for it is usually seen growing in out-of-the-way corners where the soil is considered too poor and weedy for other crops. Given a deep friable loam, a sunny situation, and ample room for growth, an enormous crop of large tubers will be ensured. As many as thirty tubers have been gathered from a single root, giving a weight of 5 lb. Helianthi, under the same conditions, yielded fifty tubers, weighing 3 lb.

Seldom does a helianthi tuber grow to any size beyond what may be termed a medium-sized artichoke, even when left in the ground for two years. This season at the Ruakura Farm of Instruction it has been observed that a disease similar to the blight in potatoes has attacked the helianthi-tubers, causing many to rot.

For forage, helianthi cannot claim much flavour. Stock will eat it when they are forced to, but they much prefer the ordinary foodstuffs. The same applies to the artichoke. Pig-food is about the only economic use to which helianthi-tubers can at present be put. If they contain nutritive value in excess of that of artichoke, they are certainly lacking palatability. As a vegetable helianthi is useless, whereas the artichoke is valuable, many classing it as a delicacy.

It is a matter of some interest to know that the nutritive value of the latter is almost on a par with that of the potato, while its yield per acre is very much about the same, probably somewhat less.

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An experiment with Rhodes grass at Hawksbury Agricultural College proved disappointing. Two and a half tons to the acre were cut off, but stock did not take to it.



STURMER PIPPIN TREE IN THE ORCHARD OF A. ALLPORT, STOKE, FIFTH SEASON AFTER PLANTING.

## FRUIT-MARKETING.

W. A. BOUCHER.

IN view of the large and steady increase in the planting of orchard lands it is most important that growers should seriously consider the methods of marketing, so that all suitable fruit that may be produced will find a ready and profitable sale. During the current season there have been many complaints that fruit has been sacrificed at prices that left no margin of profit to the grower, and also that on this account much good fruit has been allowed to rot upon the ground. While this has been the case the consumer has received no great benefit. The average retail prices have not been materially reduced; in fact, although fruit has been allowed to rot upon the ground because it was feared that profitable returns to the grower would not be realized, retail values often remain so high that fruit could only be considered an expensive luxury, and not a necessary article of daily diet. There can be no doubt that a much larger quantity of fruit than is now grown could be readily consumed if there were a smaller margin of difference between the price paid to the grower and that paid by the consumer.

During the current season, in one of our principal markets, peaches of excellent quality, well graded, and well packed, were sold at auction at 2s. per case, and afterwards retailed at 2d. each.

It is to be hoped that a New Zealand federation of fruitgrowers, the question of the formation of which has been discussed at conferences held at Wellington, Hastings, and Motueka, will be established at an early date and, as a united body representing the fruitgrowers throughout the Dominion, seriously deal with the question of bringing the grower in closer touch with the consumer, so that the consumption of locally grown fruit may be increased to their mutual advantage.

While dealing with the question of marketing, it may be as well to call the attention of growers to the fact that a proportion of the fruit crop in some districts is gathered and marketed in an unnecessarily green and unripe condition. For instance, Cox's Orange Pippins, recognized as one of our best dessert varieties, were quite recently on sale in the fruit-shops in Wellington. They had been gathered in such an immature condition as to be of no better quality for dessert than any ordinary cooking variety. Instances of this might be multiplied considerably. It is obvious that this will not assist to increase the demand for fruit.

## UTILIZATION OF POOR LANDS.

### EXPERIMENTS AT LICHFIELD.

JAS. DUNCAN.

A NUMBER of experiments are in progress on the Selwyn Experimental Farm, Lichfield, Auckland, with the object of discovering the most suitable grasses and forage plants for the pumice country of the North. Recently I visited the experimental plots at Lichfield, and found that the majority of the plots were in a satisfactory condition.

Lucerne: Of this plant  $1\frac{1}{4}$  acres had been put in; it was generally good, and in parts showed very satisfactory and encouraging growth. It will be mowed, and then top-dressed with slag. I consider this plant, from the present appearance, a decided success on these lands.

Eight plots of different varieties of swedes and turnips were put in with different manures to each plot. Turnips and swedes were sown too thickly. Where weeded and thinned the results were good, but where not thinned and weeded the results were poor. From present appearances it is evident that had the plots received fair cultivation there is not the slightest doubt they would have been a success. The ground on which the experiments were tried had been used for other experiments previously for some years and was rather dirty, while in the past season the weather was all against getting the ground clean.

It is too early to form an opinion regarding swedes, but of the soft turnips Green Globe, Red Paragon, Early Six Weeks, Devonshire Grey-stone, and Purple-top Mammoth are very good. Hardy green kohlrabi is also doing very well.

Following are the names of the different manures used on the above eight plots, viz.: Plot No. 1, slag, super, and kainit; results fair. Plot No. 2, slag and guano; results good. Plot No. 3, guano; results good. Plot No. 4, super and bone; results very good. Plot No. 5, slag and bone; results good. Plot No. 6, slag and super; results fair. Plot No. 7, super; results fair. Plot No. 8, slag; results fair.

Besides the above plots 4 acres of new ground were ploughed up, and the following experiments were then carried out:  $\frac{1}{2}$  acre of swedes and turnips (broadcast); 1 acre of barley and vetches mixed; 1 acre of sheep's burnet;  $\frac{3}{4}$  acre of tall fescue;  $\frac{1}{4}$  acre of sainfoin;  $\frac{1}{4}$  acre of serradella;  $\frac{1}{4}$  acre chicory.

These were all put in without manure, and the following have done well: Turnips, Cape barley, and vetches, sheep's burnet, serradella, and chicory—all being very good. Tall fescue and sainfoin were complete failures, there being no appearance of them. It is proposed to plant next season an acre of lucerne on this land.



## VICTORIAN STALLION LAW.

THE fifth annual report in connection with the certification of stallions by the Department of Agriculture of Victoria has been issued by the Acting Chief Veterinary Officer (Mr. Robertson). This shows that 979 horses were submitted for the official certificate of soundness and standard last season. Of these 758 were passed by the staff and 221 were refused. Over half—119—were rejected for being generally below type, while the remaining 102 were condemned as unsound from the following causes: Sidebone, 58 cases; ringbone, 16; spavin, 12; curb, 10; bog-spavin, 4; and shivering, 2. The percentage of rejection, 22.57, was a decrease of 4.12 per cent. as compared with the proportion for the previous year, which in its turn was 3 per cent. less than the figure for 1909-10. The most marked reduction has occurred in connection with the percentage of draught horses condemned as unsound on account of sidebone. The following statement gives a summary of the five years' work:—

Season.	Examined.	Certificated.	Rejections.	
			Unsound.	Below Standard.
1907-8 .. ..	918	703	138	77
1908-9 .. ..	995	742	171	82
1909-10 .. ..	757	534	113	110
1910-11 .. ..	813	596	139	78
1911-12 .. ..	979	758	102	119
Totals .. ..	4,462	3,333	663	466

Any one desirous of purchasing a weed-seed reference card may obtain one on forwarding the sum of 2s. 6d. to the Biologist, or the Editor, Department of Agriculture, Commerce, and Tourists, Wellington.

Mr. A. McTaggart, formerly a clerk in the Department of Agriculture, Commerce, and Tourists, at Wellington, and who left New Zealand for Canada four years ago to study agricultural science, has just gained his degree of Bachelor of Agricultural Science of Toronto University. At present Mr. McTaggart is in the employ of the Conservation Commission of Canada, carrying out an agricultural survey of two of the eastern provinces of the Dominion. Mr. McTaggart proposes to continue his studies in agricultural science at Cornell University, U.S.A.

## PUMICE LANDS.

G. DE S. BAYLIS.

PUMICE country varies in quality in just the same degree as do the more fertile lands on the Canterbury Plain around Christchurch or the Heretaunga Plains around Hastings vary from the poorest lands in their respective provinces. As a general rule, however, the chief ills from which pumice lands suffer are—

- (1.) Lack of decomposing organic matter.
- (2.) Consequent too open texture of the soil, due not only to the lack of organic matter but to the too coarse nature of component pumice-particles, which can only be reduced by cultivation and the disintegrating action of plant-roots.
- (3.) Lack of surface moisture in dry seasons, chiefly due to causes 1 and 2, and the lack of a thick covering of vegetation over the surface to prevent too hasty evaporation of moisture therefrom.
- (4.) Probable lack of many of the forms of bacteria and various soil flora found in the more fertile soils, but which would probably make their appearance when conditions 1, 2, 3, make life possible for them.

Although much of this country doubtless possesses, in a dormant state, enough mineral matter for the support and nutrition of plant life very considerable benefit is derived by quite small applications of artificial fertilizers.

Owing to causes 1 and 2—viz., lack of organic matter and too open texture—the frost in winter penetrates to considerable depth, and the grasses suffer considerably from being “heaved out” by its action in the soil.

Whenever the poorer portions of the pumice lands (of which several million acres exist) are really grappled with in a systematic and businesslike method, it is by the answers to problems 1, 2, 3, and 4 that these millions of acres will be brought under the plough. Any one, however, who has studied the country will realize that when problems 1 and 2 are solved, 3 and 4 will most likely follow of their own accord as a natural sequence. The question is, “Are problems 1 and 2 capable of solution”? The answer is, “Without doubt they are.” What has already been done by one or two enterprising settlers, working purely on their own initiative, proves that, with a very little methodical and systematic experiment in order to work out the details of treatment necessary, millions of acres which now are incapable of carrying a hoof could be brought under profitable occupation, and thereby add a large area of land capable of being put under the plough to the list of improved lands of the Dominion.

## BASIC SLAG.

## ITS APPLICATION.

B. C. ASTON.

## PART II.

## USE OF SLAG FOR ROOT CROPS.

WHILE for top-dressing pasture on clay lands basic slag is usually applied unmixed with other fertilizer, and for lighter lands sometimes with a slight admixture of potash salts, for crops such as turnips, mangels, rape, and potatoes, when it is intended to use slag, it will be better to mix it with an equal quantity of superphosphate or other fertilizer. Superphosphate and slag mixtures have given excellent results with root crops, enhancing both the quality\* as well as the quantity.† This was when the amount of phosphates was applied very much in excess. One would like to see in experiments with which only the usual amount of phosphate is applied whether slag and superphosphate would prove superior to an equal quantity of superphosphate alone. The experiments should be continued over several years to minimize the seasonal variations. In a dry season superphosphate has proved inferior to slag, and in a wet season superior, the acid nature of the superphosphate when undiluted by sufficient soil-water being, no doubt, especially injurious to the young seedling. The mixing of slag and superphosphate has not received the sanction of all authorities; and no doubt some intelligence is required to be exercised in using this mixture, as, when left for a little time, it sets to a hard, refractory mass. The farmer must therefore be careful not to mix up more at a time than is sufficient for his immediate needs, and if any of the mixture is left over he must clean out his drill thoroughly. Of course, it is open to him to add sufficient inert matter, such as sand, gypsum, peat, or dry earth, to the mixture, to retard its chemical action, and so prevent the setting. On soils very rich in humus and deficient in mineral matter, such as those

\* Forty sheep fed on slag-grown turnips made nearly 15 per cent. more increase than forty treated in exactly the same way but fed on superphosphate-grown turnips (West of Scotland Ag. Coll. Reports, 1901, p. 50).

† G. Gray ("Retrogression of Soluble Phosphates in Mixed Manures," Aust. A. A. of Science, 1904 Rept., p. 159) has shown that, when equal quantities of slag and superphosphate are mixed, although the water-soluble phosphate is quickly rendered insoluble in water, the total amount of phosphate which is soluble in citrate solution and is therefore readily available as plant-food had undergone little change at the end of eighteen days.

resulting from the drainage of some swamps, basic slag will, no doubt, prove superior to superphosphate or mixtures of the two, when drilled in with the seed. This type of soil is usually deficient in potash, which must be supplied with the slag, especially when attempting to grow potash-loving crops like the mangel or potato.

#### AS A DRESSING FOR PASTURE.

It is to the effect of basic slag on pasture that the attention of the New Zealand farmer will be most profitably directed. In order that the application of slag shall be beneficial, the soil and climate must conform to certain conditions necessary to success.



THE FIELD ON THE LEFT-HAND SIDE OF THE PICTURE WAS TOP-DRESSED WITH BASIC SLAG. THE FIELD ON THE OTHER SIDE OF THE FENCE RECEIVED NO MANURIAL DRESSING.

(1.) In the first place, since slag is essentially a phosphatic fertilizer, the soil must be in need of phosphate, or, as the chemist would say, it must be deficient in available phosphoric acid. At Cockle Park, in England, where the use of slag was very efficacious, the soil was deficient in phosphates. In some Scottish experiments where slag failed to produce the great and rapid improvement produced at Cockle Park it was found that the soil contained an amount of phosphate from three to ten times greater than that of the English farm (West of Scotland Ag. Coll. Report, 1911, p. 38: Somerville, p. 4). As most New Zealand soils are deficient in phosphates, this condition may generally be assumed to be satisfied.

(2.) Basic slag is an alkaline fertilizer containing an excess of caustic lime, hence soils which are already alkaline in reaction due to the presence of carbonate of lime would probably receive more



benefit from superphosphate—an acid fertilizer—than from an equivalent quantity of slag. Most of our soils are, however, deficient in carbonate of lime, and are acid or sour, so that this condition is usually favourable to the use of slag.

(3.) As a top-dressing for pasture, in order to be beneficial, slag requires a climate with a well-distributed rainfall, slag being only slowly dissolved by water containing carbonic acid; whereas superphosphate is entirely and quickly dissolved by pure water. A moist climate is therefore a prominent factor in the successful use of slag; if deficient in phosphates, soils in dry climates with few rainy days are better treated with superphosphate.

(4.) Sandy soils are considered to be not so responsive to slag as are clay soils, nevertheless the herbage on the coarse sandy pumice soils of the North Island is greatly benefited by slag, although superphosphate more quickly shows beneficial results.

(5.) The greatest immediate effect of slag is manifested on the leguminous (clovers, &c.) components of the pasture, the white clover (*Trifolium repens*) being especially benefited. It is therefore necessary that these plants should be present in the pasture. Experiments with slag in Scotland, Professor Patrick Wright ("Improvement of Poor Pastures," p. 10) tells us, failed owing to the absence of clovers in the pasture. When, however, clover-seed was supplied the effect of slag on these soils was quite as remarkable as on those of Cockle Park.

There are several other important points regarding the application of slag which may be briefly touched on; but in discussing the subject it must be borne in mind that the conclusions arrived at and the advice given must not be considered infallible. It should be clearly understood that these are supported by certain evidence, and are no doubt true for the conditions under which the experimental evidence was originally obtained. All of these conditions may not be known, and others may be unattainable; hence the difficulty in drawing from experiments conducted in the Northern Hemisphere conclusions which shall help us in New Zealand.

In England it has been proved more profitable to apply a heavy dose of basic slag as a single dressing than to divide it into two equal portions, and to apply these with a three-years interval (Somer ville: "Influence on the Production of Mutton of Manures applied to Pasture,"\* 1911, p. 57). In New Zealand, at Waerenga, Waikato, 1911, the aggregate yield of green grass per acre for the four years on a paddock which had been dressed with half a ton of slag in one appli-

\* Every grazier should obtain this (price 4d.) from the British Board of Agriculture.

cation was  $22\frac{1}{2}$  tons, whereas where the same quantity of slag was distributed over the four years in four annual dressings, the aggregate yield was only  $10\frac{3}{4}$  tons (Dept. of Ag. Ann. Rep. 1909, p. 352). The following results were obtained:—

Plot.	Manure (Uniform Cost, 15s. per Acre per Annum).	Yield of Green Grass per Acre.			
		1905.	1906.	1907.	1908.
		lb.	lb.	lb.	lb.
1	No manure .. .. .	520	620	720	1,500
2	10 cwt. basic slag, 2 cwt. kainit, applied 1905 .. .. .	6,900	9,275	7,780	8,800
3	10 cwt. basic slag, applied 1905 .. .. .	7,390	15,110	14,440	13,600
4	373 lb. basic slag, applied annually .. .. .	2,010	4,860	10,020	7,200
5	2 cwt. 2 qr. 14 lb. super., applied annually .. .. .	3,680	8,515	9,300	9,100

In these results the increase in yield on the untreated plot is noticeable. The stock grazed across the plots no doubt distributed a greater amount of phosphates on No. 1 plot than they would otherwise have done had there been no greater excess of phosphate in their food than usual.

It is to be regretted that it was not possible to continue these experiments a few more years, in order to ascertain how long the good effects of slag would have been produced with such intensity. In England the effects of slag were not nearly exhausted at the end of nine years. The Waerenga soil was a stiff clay deficient in carbonate of lime and containing only traces of available phosphate, but having a considerable excess of available potash. The rainfall was from 50 in. to 60 in., falling on 190 days. Clovers were present in good amount, and the effect of the slag was most marked in increasing the clovers. This could not be attributed to the action of the lime in the slag liberating potash from the clay, as that fertilizer was already present in amount more than sufficient.

Clovers increase the amount of nitrogenous organic matter in the soil; and when they decrease in quantity, as they do in a few years, the soil is left in a much better condition for the growth of grasses, which are greatly benefited by the increased nitrogen and the better mechanical state of the soil due to the additional humus. A dressing of potash at this stage is often beneficial. Some experiments lead to the conclusion that, even after a heavy dressing of slag has been applied, further applications are often profitable.

There is some evidence that the conditions in New Zealand are much more favourable than in England to the use of slag. One need only point to the quicker action of slag here, the smaller quantity which produces positive results, its beneficial action on some coarse

sandy soils, and the unusually good effect of the coarse particles of slag (Aston "On the Manuring of Pastures in New Zealand") in support of this statement. At the same time it must be remembered that there are undoubtedly large areas in New Zealand to which slag is unsuited. This is an aspect of the subject on which it is hoped to publish further definite geographical advice in the future.

In valuing the effect of slag it must be remembered that, apart from the enhanced quantity of growth produced, the feeding-quality is greatly improved. In a field an unfenced portion of which has been dressed with slag, the stock may be found to graze on this so heavily that the pasture is "eaten out." An unobservant experimenter, on inspecting the plots, might then fall into considerable error regarding the efficacy of slag.

In conclusion, it may be pointed out that possibly there is much yet to be learnt as to the action of slag. There is one constituent of slag that does not occur in other artificial fertilizers to any extent—viz., iron—and iron compounds are known to exert a beneficial influence on the bacteria of the soil, especially the azotobacter—the organisms which fix the nitrogen of the air.

It is difficult to condense all one would like to say within the compass of a magazine article, but it is hoped that some of the leading facts with regard to slag have now been made more clear to the farmer, and that he will realize the great possibilities of slag as a factor in the improvement of his pasture.

At the next meeting of the Holstein-Friesian Association of America a proposal will be considered to erect a permanent home for the association in some city of New York at a cost of £20,000.

**I**T is a mistake to think that manurial treatment is the first essential in profitable production. The chief object of the farmer should be to get his soil into the best condition by drainage, if necessary, and by proper cultivation and aeration of the soil, so that beneficent bacterial life may be encouraged and the natural stores of plant-food be thereby made available to the plants being cultivated. Subsequent cultivation, to retard undesirable growth and conserve moisture and otherwise ensure ideal growing conditions, is equally necessary.

## POTATOES.

### RUAKURA EXPERIENCE.

A. W. GREEN.

THE number of new varieties of potatoes brought forward and placed on the market during the last few years has been prodigious. The problem which variety is the best, is thus being yearly intensified. However, it is experience that teaches. After handling considerably over three hundred varieties during the past five years, I venture to place before the farmer these few notes.

As an all-round main-crop potato I give preference to Up-to-Date amongst all varieties. Many may not agree with me on this point, but I may suggest that their principal reason in differing will be on account of its susceptibility to blight. It is of excellent quality for table use, ideal in shape, shallow in the eye, of a white skin, and, above all, a constant and heavy cropper, yielding a large average-sized potato. With systematic spraying with Bordeaux mixture the Up-to-Date at Ruakura Farm of Instruction has never yet failed to yield a heavy, clean and payable crop of tubers. No other potato adapts itself equally well to such a variety of soils, or to so wide a range of season during which it may be successfully planted.

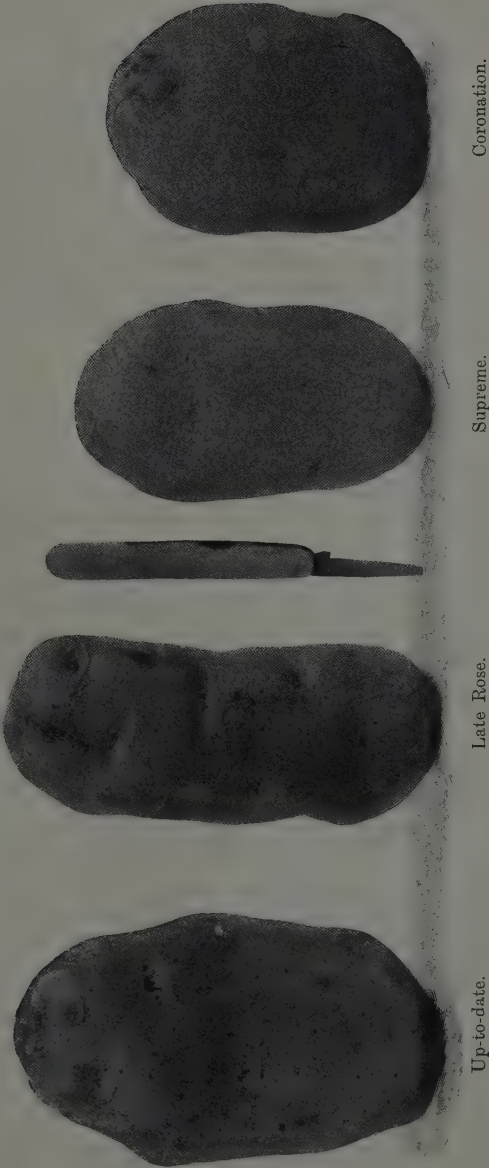
To those who cannot attend carefully to spraying, or find that Up-to-Date blights in their locality, I recommend Northern Star. This variety has been proved to resist blight to a greater extent than most others. It nevertheless has two drawbacks. One is its inferior quality; the other its liability to produce second growth from the tubers. The average size of the potatoes in a crop of Northern Star at Ruakura seldom reaches that of Up-to-Date. On a dry, loose loam the quality of Northern Star is improved. It may possibly be planted earlier, but not so late, as Up-to-Date.

To those who wish to grow for early market either Henderson's Early Puritan or Abundance is good.

A most promising, highly blight-resisting variety is Southern Cross, but it requires further testing before its merits can be accurately determined. There is little doubt the old early variety, Lapstone Kidney, which was favourite before blight became so prevalent, has been difficult to replace.



SELECTED POTATOES AT THE RUAKURA FARM OF INSTRUCTION.



In the foregoing group photograph, which reads from left to right, Up-to-Date, Late Rose, Supreme, and Coronation, it has been attempted to choose varieties which allow of a wide range of soil-conditions. Up-to-Date has already been described, but placed here for comparison. Late Rose, a long red-skin potato, has been chosen as one which may be successfully grown on well-drained light peaty swamp. Supreme is an oval to long, uniform, white-skin variety having shallow eyes. This may be grown on heavy stiff land, and up to the present time has not been in the least affected by scab. Coronation, an oval to round purple-skin variety much resembling Runciman's Purple, proves suitable for light sandy soil with gravel subsoil. On a heavy stiff soil this potato is liable to grow excessive haulms, and on digging a root one is astonished to find only rough inferior tubers.

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### CO-OPERATIVE SOCIETIES IN GERMANY.

ACCORDING to the latest official statistics available, there were in the German Empire, on the 1st January, 1909, 28,141 registered co-operative societies with 4,579,740 members. Of these societies 21,459 are chiefly rural in character. The most widespread co-operative movement is that of the credit societies; of these there are 16,641 co-operative credit organizations, no less than 14,596 being rural in character. There are 1,919 co-operative societies for the purchase of farm requisites, 393 for threshing, and 27 for steam ploughing. The number of agricultural co-operative sale societies is 349: 133 for the sale of cattle, 114 for poultry-improvement and the sale of eggs, 88 for the sale of corn, and 44 miscellaneous co-operative marketing societies. There were, further, 3,584 agricultural co-operative manufacturing and marketing societies: 3,070 being dairies, 194 wine societies, 199 distilleries, 104 societies for the sale of fruit and vegetables, 4 slaughterhouses, 9 fishermen's societies, and 4 forestry societies. We find, finally, 232 co-operative societies for improvement of cattle.

Of the 28,141 co-operative societies considered in the statistical report, 24,404 are members of federations, whilst only 3,737 belong to no federation. The central co-operative societies are 117 in number, divided as follows: 64 co-operative banks, 2 for the purchase of necessities, 20 for the purchase of farm requisites, 25 for the purchase of agricultural produce. Of the 117 central co-operative societies 102 were affiliated to inspecting federations.

The central co-operative societies have altogether 23,966 members, 16,246 co-operative societies, 232 corporations, and 7,488 individual members. The total amount guaranteed by the liability of the members of the central co-operative societies is 325 million marks (£16,250,000); the liability of only one central society is unlimited.

Counting also the Central Agricultural Loan Bank of Germany, which, although not of the ordinary form of a co-operative society, is conducted on co-operative principles, it may be stated that 21,764 co-operative societies, with 3,183,783 members—that is, 75 per cent. of the total number of co-operative societies—are affiliated to the central co-operative societies.

## THE RUAKURA SWEDE CROP FOR 1912.

PRIMROSE MCCONNELL.

IN issuing any report from this station, particularly on manurial experiments, and in order to clear away any misconception that may arise in the minds of those who are farming some of the rich soils of South Island provinces, it is only fair to state that at this station (Ruakura) we are farming under exceptional circumstances. When I state that some of the soil on this farm in its raw state is almost sterile, and when it is compared with some of the land in the South Island on which I have known twenty successive and successful crops to be grown without any application of manure, it ought to be very clear to the South Island farmer that this requires very liberal treatment, and that the rules of manuring that are successfully applied here are, generally speaking, not suitable for South Island conditions. I might also state that some of the farmers in this district manure even more liberally than we do on the State Farm, and do not hesitate to state that it pays to do so.

The accompanying photo, which is in no way exaggerated, may serve to illustrate what I have stated.

The paddock on which the swede crop was grown was previously undrained swamp of a very poor nature, rendered more so by repeated burnings, and when first ploughed (May, 1911) the principal vegetation was tall rushes. During August, September, and October, the wet portions were thoroughly pipe-drained, the size of the main pipe drains being 4 in. and the branches 3 in. The cost of draining when distributed over the whole paddock was £6 per acre.

Following is a history of the preparatory cultivation: May, ploughed 4 in. and rolled; August, twice disced and ploughed with digger 7 in.; September, levelled with heavy wooden leveller. Four times disced, levelled, tine-harrowed, rolled, disced, levelled, tine-harrowed, thrice disced, levelled, tine-harrowed, disced, and chain-harrowed.

In August the whole paddock received a dressing of 9 cwt. per acre of carbonate of lime, a strip across the whole paddock receiving 20 cwt. per acre mixed with  $2\frac{1}{4}$  gallons of crude carbolic acid. The latter has a reputation in Britain as a club-root preventive; and the experiment in this instance was made with the object of testing its value as a blight-preventive. Fortunately, the season was not suitable for the development of the latter, the only variety showing any signs

of blight being John Bull. The result is of considerable importance to local farmers, as John Bull is the favourite swede in this neighbourhood. Twenty varieties were tested, including four the seed of which was obtained from the Guelph College, Canada. Taking all points into consideration, Garton's Superlative stands at the top, with Magnum Bonum a good second. Superlative has also the inestimable quality of being club-root-proof, but no claim has ever been made that it is blight-proof. Two acres of this variety were sown with seed grown from roots which I selected at the Moumahaki Experimental Farm, and the resulting roots, in comparison with those from imported seed, were in every way superior. A further selection has been made this season. When selecting the latter it was noticed that all varieties without exception showed a discolouration of the centre of the bulb, which I at first took to be the beginning of "rot." Considerable time was spent in examining roots over the whole paddock, and it was found that every part was affected with the exception of a strip 4 to 5 yards wide across the ends of the rows adjoining the railway-line. Seeing that the strip in question received absolutely the same treatment as the adjoining portions of the paddock, the absence of discoloration in the centre of the bulbs can only be accounted for by the close proximity of an open drain, which runs by the railway-side and which has the effect of curing the acidity in the soil, or possibly as resulting from the soot thrown off and deposited on the soil by the frequently passing railway-engines. Two specimen roots were forwarded to the Biologist, whose verdict was to the effect that there was no sign of bacterial disease, the discoloration being possibly caused by the swampy nature of the soil. On inquiry I find that such discoloration is peculiar to the neighbourhood, and undoubtedly caused by acidity through want of proper drainage.

The success of this crop is, I believe, to a great extent due to thorough preparatory cultivation. The poor crop on the unmanured plot may seem to negative such a conclusion; but I feel sure that without extra cultivation the unmanured plot would have grown no crop whatever, and I have also no hesitation in stating that the manures applied gave comparatively good results because the soil had been thoroughly worked previous to their application. All experiments go to show that manures applied to indifferently cultivated soil are, to some extent, wasted.

The turnip-seeds and manures were sown on 20th-27th December by the double-ridger in rows 27 in. apart, the plants being singled out to a distance of 9 in. apart in the rows. The rows were three times horse-hoed during the season, and the whole paddock was almost free from weeds. Portions of the manurial plots were crossed with sulphate of ammonia, nitrate of soda, and sulphate of potash, each





A DEMONSTRATION OF THE EFFECT OF MANURING MADE AT THE HAMILTON WINTER SHOW BY THE RUAKURA FARM OF INSTRUCTION.

The mangels from the unmanured land were grown side by side with the roots from the manured soil, and were taken from an equal area of soil. The roots at the foot of the picture were grown in soil manured with basic superphosphate, 4 cwt. The yield was  $25\frac{1}{2}$  tons to the acre, the cost per ton of gain being 9d.

applied separately, but these dressings had no effect whatever, good or bad. The following table gives the result of the manurial tests:—

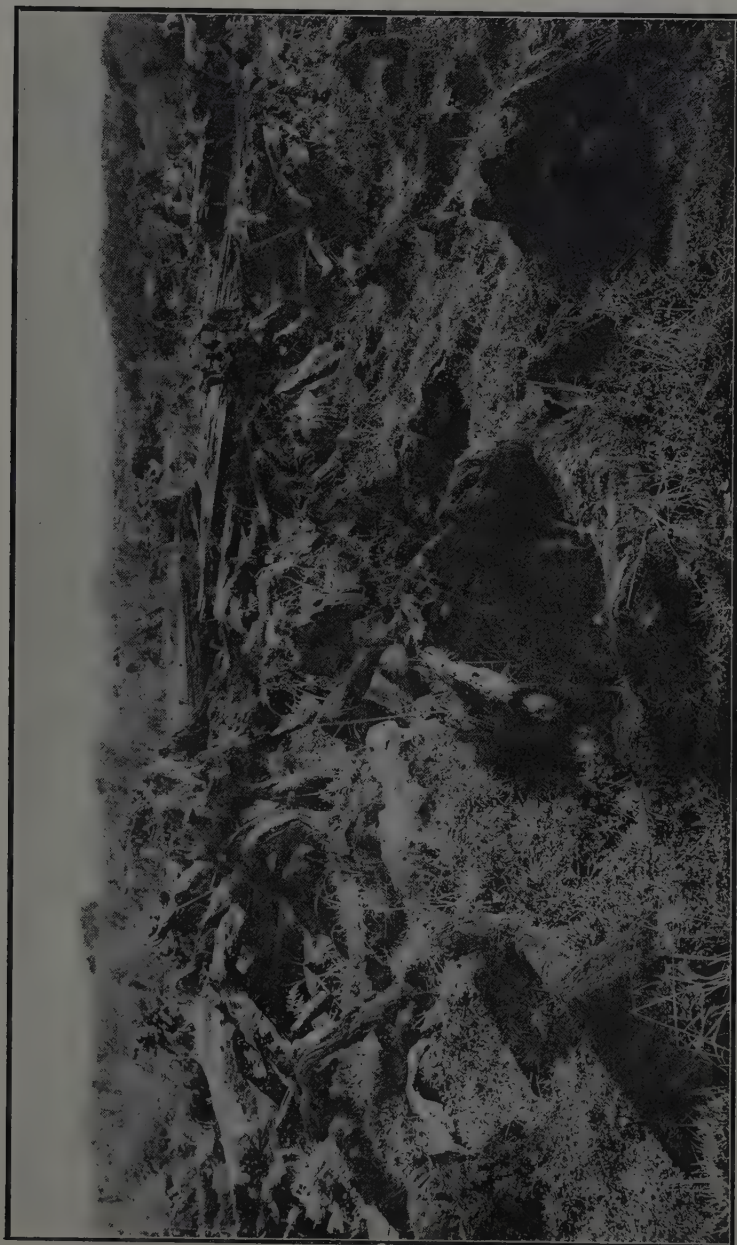
Plot.	Fertilizers applied per Acre.	Cost per Acre.	Yield per Acre, in Tons.	Gain by manuring, in Tons.	Cost of Gain per Ton.
		£ s. d.			s. d.
1	Not manured .. .. .		1-50		
2	5 cwt. Seychelles guano .. ..	0 18 0	28-42	26-92	0 8
3	2½ cwt. Seychelles guano, 2½ cwt. super-phosphate	1 0 3	28-72	27-22	0 9
4	2½ cwt. Seychelles guano, 2 cwt. super-phosphate	0 18 0	27-42	25-92	0 8
5	4½ cwt. basic superphosphate ..	0 18 0	28-82	27-32	0 8
6	5 cwt. basic slag .. .. .	1 0 0	21-04	19-54	1 0
7	4½ cwt. equal quantities of super., basic super., basic slag, and Seychelles guano	0 19 0	31-00	29-50	0 8
8	4½ cwt. superphosphate .. ..	0 18 0	30-72	29-22	0 7½
9	5 cwt. Laurie's special turnip-manure..	1 16 6	30-61	29-11	1 3

Each of the experimental plots was ¼ acre in extent. The plots are side by side, and run the full width of the field. The soil throughout the plots is of a similar nature as far as the eye can judge. A tenth of each plot was carefully measured and the produce weighed, the weight of the tops not being included.

Summarizing on the above, it must be confessed that the result from the basic slag plot is disappointing, while that from the Seychelles guano plot is a pleasant surprise. The guano is theoretically very insoluble, but, whether or no, its action in this case was equally as quick as that of superphosphate, and the plot, as far as the eye could judge, was the healthiest in the whole paddock. Unfortunately, this system of manuring does not enable us to follow after-results; but in order to enable us to do so a 14-acre paddock is now being laid out in ½-acre duplicated plots, each of which will be manured with different manures or mixtures, but the same manure or mixture will be applied to the same plot year after year. There will, of course, be an unmanured plot as a check, and it will be more than interesting to watch the result from non-manuring on this soil.

The following are the yields of the varieties (per acre): Superlative, 32 tons; Up-to-Date, 18 tons; Crimson King, 28 tons; Magnum Bonum, 30 tons; Queen, 20 tons; Kangaroo, 30 tons; Elephant, 31 tons; Defiance, 29 tons; Ne Plus Ultra, 20 tons; Monarch, 27 tons; Hall's Westburg (Canadian), 20 tons; John Bull, 25 tons; Mammoth Clyde (Canadian), 21 tons; Good Luck (Canadian), 28 tons; Jumbo (Canadian), 25 tons; Purple Top, 31 tons; Champion, 29 tons.

The manures applied to the variety crop were 2½ cwt. of superphosphate (through the seed-coulter) and 2½ cwt. of basic superphosphate (through the manure-coulter). Seventy-one bullocks were turned on to



RUAKURA FARM OF INSTRUCTION IN THE MAKING.

the crop on the 23rd May, and the crop (10 acres in extent) will carry this number for two months and still leave behind a great deal of sheep-feed. Taking all circumstances into consideration, the crop is a highly satisfactory one, although farmers who are fortunate enough to be farming some of the rich soils of the South Island and who can grow big crops without manuring may not think so.

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## APPRECIATION.

THE following letter has been addressed by Mr. F. Milner, M.A., Headmaster of the Waitaki Boys' High School, to Mr. A. Macpherson, Supervisor of Co-operative Experiments in the South Island:—

“I have asked Mr. Taylor, of your Department, to be good enough to see that the school plots are adequately represented by an exhibit at the forthcoming Otago Winter Show. He has promised to see to this.

“Now that the roots have been pulled and the boys have gone on vacation I wish to express to you, on behalf of the school, and especially on behalf of the agricultural class, our deep sense of appreciation of your careful supervision and unfailing assistance. As an indication of the fact that I am personally seized of the great importance of this agricultural experimental work, I may mention that the field of 4 acres now being utilized was purchased at my own expense for this school purpose. Moreover, my Board, at my earnest request, have just built and equipped a very fine agricultural laboratory (in addition to the chemical laboratories) for the due prosecution of soil-analysis, milk-testing, &c., *pari passu* with the experimental field-work. I mention this because I do not wish you to think this is a mere perfunctory expression of gratitude to the Department for the stimulatory help accorded to us. The whole of the agricultural class of upwards of forty boys are ultimately going to the land as farmers. This course of work here has been made as vocational as possible. Nothing in the whole gamut of the school work has given me greater pleasure than to witness the keen interest displayed in the field experiments by the boys. Moreover, the plots have been inspected by hundreds of visitors, including parents and farmers of North Otago. I may also mention that every boy in the agricultural class personally subscribes to the Department's *Journal of Agriculture* and files his copies for future reference.

“You will agree, I feel sure, that the work has been a living thing. We fully and gratefully realize that but for your kindly and ready assistance and advice the field experiments would have been shorn of most of their present undoubted utility.”

## SEMI-OFFICIAL TESTING.

D. CUDDIE.

ONE of the most gratifying developments of the dairy industry of late years has been the importation and breeding of purebred cattle. Large sums of money have been spent in bringing to this country typical specimens of the well-known dairy breeds, including males and females of Jersey, Holstein, and Ayrshire stock. These importations are still going on, and many first-class animals have reached the Dominion to maintain and improve the already fair standard of our stock, some of which were bred from animals previously imported by enterprising breeders in the days when dairying was a business of insignificant dimensions.

With the advancement of yield-testing of crossbred cows and a keener desire on the part of dairy-farmers to obtain higher returns an improved demand has been created for purebred sires whose dams are of high milking-capacity. In fact, many dairy-farmers all over New Zealand now realize the importance of using no other bulls than those of a purebred strain.

There are now many deep-milking cows amongst the popular breeds; and some of the owners of these animals have complete records of the milk and butter-fat production of their stock. But notwithstanding the fact that these records may be quite accurate and dependable, both buyers and sellers of pedigree animals are prepared to acknowledge that it would be mutually beneficial to them to have the production of their best stock checked by some independent authority. All breeders recognize that pedigree does not always mean performance, and the compilation of duly authenticated milk-records will therefore tend to popularize the particular breeds concerned, safeguard the dairy-farmer against the purchase of the wrong class of animals, facilitate the sale of stock between the breeders themselves, and probably pave the way for a remunerative export trade in purebred dairy cattle.

This matter was recently brought under the notice of many owners of purebred dairy cattle of the various breeds, most of whom agreed that semi-official records of performance would prove beneficial to all concerned.

Mr. W. M. Singleton, Assistant Director of the Dairy-produce Division, drew up a basis on which the work might be undertaken, for the consideration of the associations of registered purebred dairy cattle, and this was placed before the Ayrshire and Holstein-Friesian Associations at their annual meetings held in Palmerston North during the course of the recent National Dairy Show. The subject was fully



discussed by the writer with those in attendance, and the Holstein breeders agreed to adopt the system as set out.

The following rules, which have been drawn up to govern the semi-official testing of purebred dairy cows, will give an indication of the lines on which it is proposed to carry out the work:—

#### RULES FOR THE SEMI-OFFICIAL TESTING OF PUREBRED DAIRY COWS.

1. The Department will assist in the semi-official testing of only such cows as are properly and duly registered in the New Zealand Herd-book of the breed to which they belong.

2. When a breeder desires to have a cow tested for a semi-official record he must intimate his desire to the secretary of his Breeders' Association.

3. It will be the duty of the secretary of the Breeders' Association to see that such cow or cows is [are] duly registered, and to notify the Department of the owner's wish a fortnight prior to the date of calving of the particular cow or cows, and to state that such cow or cows is [are] eligible.

4. Every cow, in order to qualify for a semi-official record, must drop a calf within fifteen months of the commencement of her test; and no four-year-old or mature cow can be accepted for test unless she has dropped a calf within fifteen months of the commencement of the test.

5. The owner will agree to weigh or cause to be weighed each and every milking of the cow during her lactation period. Record blanks for this purpose will be supplied by the Department. Within a week after the end of the month, the owner shall forward an ink copy of this record to the Director of Dairy-produce, Wellington.

6. If a weighing of milk be inadvertently or otherwise missed this space shall not be filled in by the owner, but must be left blank and an explanation forwarded, so that the particular space may be filled in by the Department, when the cow will be credited with what is considered to be the correct figures.

7. The inspecting officer of the Department is to have the right at any time to visit the farm on which a cow is under test. He shall take the weights and samples of four consecutive milkings as nearly as possible every month. This sample shall be kept under lock and key or sealed between milkings. The sample of milk will be tested for butter-fat by a departmental officer, and the monthly fat-production of the cow will be estimated by taking the total weight of milk for the month from the owner's sheet and the butter-fat test of the composite sample of the four milkings.

8. The owner shall at the end of the lactation period or test forward a report of the yearly production of milk taken from the monthly records on a form supplied by the Department, and shall make affidavit before a Justice of the Peace that this is true and correct.

9. The annual production will be obtained by totalling the production of pounds milk and butter-fat for each month during one lactation period, and not exceeding twelve months.

10. During the period of the departmental officer's visit to the farm for checking and sampling purposes, not more than one cow under inspection shall be milked at one time.

11. The names of heifers and cows which produce up to the minimum pounds of milk and pounds butter-fat required by their class will be given a semi-official record.

#### CLASSES.

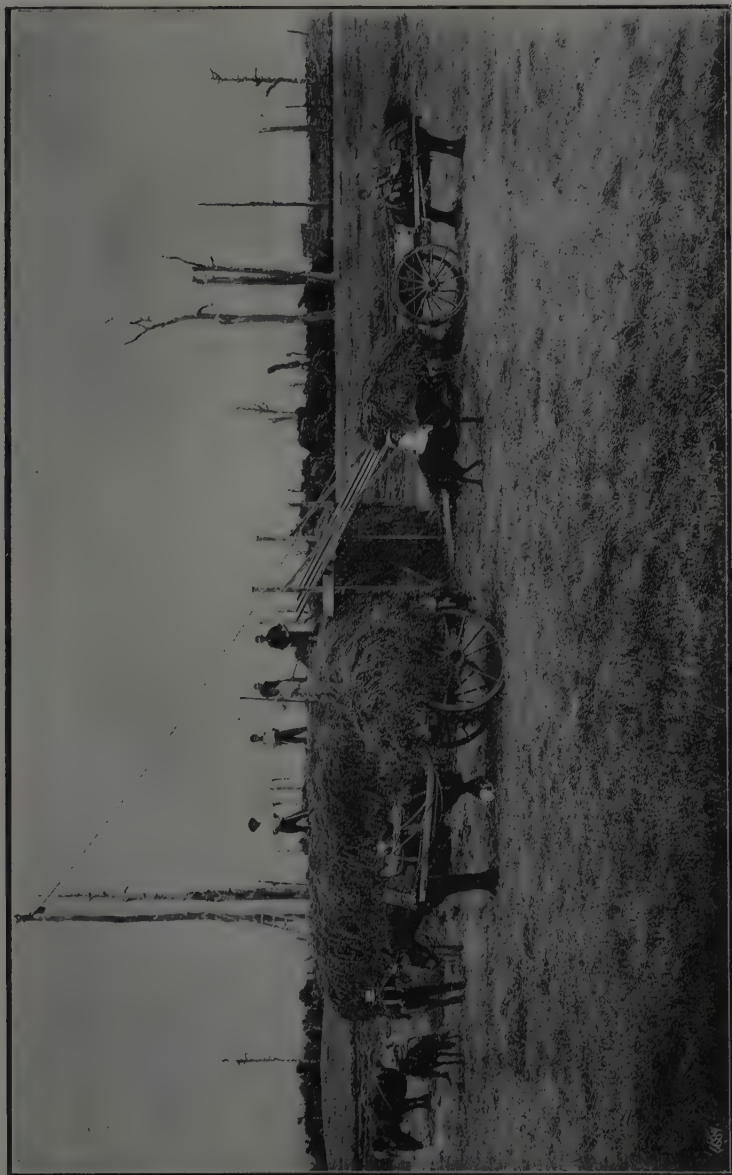
Cows under three years old shall be classed as two-year-olds; cows from three to four years old shall be classed as three-year-olds; cows from four to five years old shall be classed as four-year-olds; cows five years old and over shall be classed as mature.

#### YIELD OF BUTTER-FAT REQUIRED FOR SEMI-OFFICIAL RECORD.

##### *For Holsteins.*

	Lb. Fat.
If two years old at the commencement of the test,	240·5
If three	277·0
If four	313·5
If mature	350·0

A heifer starting a test on the day when she is two years old, or before that date, shall give the amount of butter-fat required for a two-year-old. For every day she is over two years old she shall give 0·1 lb. of fat more. This increase will be required until when as a cow five years old she shall give the requirement for a mature cow.



ENSILAGE-MAKING ON THE FARM OF MR. A. C. PEASE, OF ELTHAM, ILLUSTRATING A VERY SIMPLE METHOD OF ELEVATING THE MATERIAL BY MEANS OF A SLOPING PLATFORM AND A BLOCK AND TACKLE.

## FOOD AND MILK-PRODUCTION.

### AN INTERESTING PROBLEM.

IN these days of herd-testing and appreciation of the milk-record bull the fact is being more generally realized that it pays to feed a cow well. The relative value of food to milking-capacity is not, however, appreciated to the extent it should be, even by the more progressive of our dairy-farmers. True, many owners of well-selected and intelligently bred herds believe in the liberal feeding of their stock, but the problem of providing only the best milk-producing foodstuffs has hardly yet entered into the consideration of the working-farmer. The fact is generally realized that the quality of the pasture must be maintained if dairying is to be made profitable. The expanding use of basic slag as a top-dressing for pastures in our chief dairying districts is an assurance of this. This appreciation of quality in pasturage, gratifying as it is, can only, however, be regarded as touching the fringe of the underlying principle. The farmer is not altogether to blame, for while scientific investigation has shown him the way to improved results in many directions it has failed to indicate much of direct practical value as to the definite relation of food-constituents to milk-formation. The ancients recognized the influence certain foods had on the milk, and many recipes were in vogue for increasing the milk-supply. Beans, peas, and lentils were recommended for the purpose. "Recently," says the *London Dairy*, "a preparation of cotton-seed has been tried with much success, increasing the mother's milk both in quantity and in fat and casein. The product has been minutely described by Dr. Ballerin, of Paris. Cotton-seeds are reduced to a fine powder, the oil and resinous matters are extracted by ether and benzine, and the active principle obtained by infusing the residue, and thereby getting rid of the colour and odour. The resultant liquid is concentrated in vacuo and the blocks pulverized. This powder is free from cellulose, oil, and other indigestible products. It has no toxic properties. The active principle, so far as milk-producing properties are concerned, is edestine. The product has been administered to domestic animals, with the result that the quantity of milk increased by 30 per cent., and the fats and solids in corresponding proportion."

The above claim in regard to cotton-seed cannot be accepted as conclusive on the bare statement circulated. It is an accepted fact

that a cow cannot produce up to her maximum capacity unless she is supplied with an abundance of good food. If the French investigations are to be of any definite value it will be necessary to know exactly how the control animals were fed prior to being placed on an edestine diet. It is well known by British dairy-farmers that cotton-seed cake is the best of all concentrated foodstuffs for milk-production, and it is therefore feasible that the scientist has been able to ascertain the responsible element. What concerns the New Zealand dairy-farmer, however, is having definite knowledge as to the relative values from a milk-production viewpoint of grasses for his pastures and of fodder crops to supplement them. There is here a fertile field for experiment. In the meantime, however, the facts related above should convince the farmer that it is quality rather than quantity that determines the value of the feeding-materials he has at command, and that therefore the maintenance of clean and high-quality pastures is of paramount importance, while properly made hay from the best grasses is equally necessary.

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MOLINA'S GENERAL, BY NOBLE OF OAKLANDS—MOLINA.

A high-type young Jersey bull imported last year from the Island of Jersey by Messrs. Bayly, Healy, and Hancock, of Stratford.

## IMPORTATION OF FERTILIZERS.

B. C. ASTON, F.I.C.

THE following particulars of the importation of fertilizers into New Zealand for the year ended 31st March, 1911, are compiled from returns furnished by the Customs Department. The port of entry, name, and quantity of fertilizer, and country whence imported are shown respectively :—

### *Auckland.*

Bonedust : New South Wales, 3,203 tons ; Bengal, 4,915 tons ; Queensland, 25 tons.  
 Bone char : New South Wales, 96 tons.  
 Bone phosphate : New South Wales, 326 tons.  
 Blood and bone : New South Wales, 50 tons.  
 Superphosphate : United Kingdom, 3,894 tons ; New South Wales, 1,152 tons ; Germany, 203 tons ; Japan, 848 tons ; Belgium, 50 tons.  
 Guano : New South Wales, 176 tons ; Malden Island, 1,142 tons ; Surprise Island, 600 tons ; Ocean Island, 1,700 tons ; Society Islands, 7 tons.  
 Rock phosphate : Victoria, 100 tons ; New South Wales, 5 tons.  
 Basic slag : United Kingdom, 3,744 tons ; Germany, 1,160 tons ; Belgium, 1,525 tons ; United States of America, 50 tons.  
 Sulphate of potash : New South Wales, 42 tons ; Germany, 190 tons ; Belgium, 20 tons.  
 Muriate of potash : Germany, 45 tons.  
 Kainit : United Kingdom, 77 tons ; Germany, 681 tons.  
 Potash salt : Germany, 10 tons.  
 Sulphate of ammonia : New South Wales, 67 tons.  
 Nitrate of soda : New South Wales, 217 tons ; Belgium, 30 tons.  
 Gypsum : South Australia, 710 tons ; New South Wales, 101 tons.  
 "Jadoo" : United Kingdom, 1 ton.  
 "Turnip-manure" : United Kingdom, 260 tons.

### *Kaipara.*

Bonedust : New South Wales, 372 tons.

### *New Plymouth.*

Bonedust : Bengal, 375 tons.  
 Superphosphate : United Kingdom, 215 tons ; Victoria, 188 tons ; New South Wales, 155 tons.  
 Guano : South Australia, 64 tons.  
 "Mineral earth" : South Australia, 60 tons.  
 Basic slag : United Kingdom, 588 tons.

### *Patea.*

Superphosphate : United Kingdom, 12 tons.

### *Wanganui.*

Superphosphate : United Kingdom, 100 tons.  
 Gypsum : South Australia, 5 tons ; Victoria, 10 tons ; Germany, 10 tons.

### *Wellington.*

Bonedust : Bengal, 50 tons.  
 Superphosphate : United Kingdom, 1,479 tons ; Victoria, 1,101 tons ; New South Wales, 1,490 tons ; Germany, 10 tons.



Guano : United Kingdom, 2 tons ; Victoria, 59 tons ; New South Wales, 40 tons.  
 Phosphates unspecified : United Kingdom, 105 tons ; New South Wales, 80 tons ; South Australia, 50 tons.  
 Basic slag : United Kingdom, 938 tons ; Germany, 210 tons.  
 Sulphate of potash : United Kingdom, 5 tons ; Germany, 85 tons ; Holland, 20 tons.  
 Kainit : United Kingdom, 8 tons ; Germany, 156 tons.  
 Sulphate of ammonia : New South Wales, 2 tons.  
 Nitrate of lime : Norway, 5 tons.  
 "Grain-manure" : United Kingdom, 38 tons.  
 Gypsum : Victoria, 107 tons ; South Australia, 75 tons.

*Napier.*

Bonedust : New South Wales, 14 tons.  
 Superphosphate : New South Wales, 280 tons ; United Kingdom, 300 tons ; Japan, 361 tons.  
 Guano : New South Wales, 57 tons.  
 Phosphates unspecified : Belgium, 55 tons.  
 Basic slag : United Kingdom, 10 tons.  
 Sulphate of potash : Germany, 5 tons.  
 Kainit : Germany, 55 tons.  
 Sulphate of ammonia : New South Wales, 15 tons.  
 Gypsum : South Australia, 40 tons ; New South Wales, 14 tons.

*Blenheim.*

Superphosphate : Victoria, 5 tons ; United Kingdom, 17 tons.

*Nelson.*

Superphosphate : United Kingdom, 190 tons ; Victoria, 30 tons.  
 Guano : South Australia, 70 tons.  
 Basic slag : United Kingdom, 75 tons ; Germany, 55 tons ; Belgium, 10 tons.  
 Muriate of potash : Germany, 6 tons.  
 Kainit : Germany, 10 tons.  
 Sulphate of ammonia : Queensland, 4 tons.  
 Gypsum : Victoria, 11 tons.

*Christchurch.*

Superphosphate : United Kingdom, 400 tons ; Victoria, 757 tons ; New South Wales, 2,317 tons ; Tasmania, 467 tons ; Japan, 1,854 tons.  
 Basic slag : United Kingdom, 125 tons.  
 Sulphate of potash : United Kingdom, 25 tons ; New South Wales, 10 tons ; Germany, 255 tons.  
 Sulphate of ammonia : New South Wales, 2 tons.  
 Gypsum : United Kingdom, 16 tons ; Victoria, 64 tons ; South Australia, 600 tons ; New South Wales, 50 tons.  
 Unenumerated : United Kingdom, 2 tons.

*Timaru.*

Bonedust : New South Wales, 10 tons ; Bengal, 150 tons.  
 Superphosphate : United Kingdom, 1,940 tons ; Victoria, 320 tons ; New South Wales, 575 tons ; Germany, 95 tons ; Japan, 1,557 tons.  
 Guano : New South Wales, 25 tons ; Malden Island, 1,150 tons.  
 Potash salt : Germany, 58 tons.  
 Gypsum : New South Wales, 10 tons ; South Australia, 500 tons.

*Oamaru.*

Superphosphate : United Kingdom, 40 tons ; New South Wales, 25 tons.

*Dunedin.*

Bonedust : New South Wales, 158 tons ; Bengal, 315 tons.  
 Blood and bone : United Kingdom, 150 tons ; New South Wales, 250 tons.  
 Superphosphate : United Kingdom, 320 tons ; Victoria, 650 tons.

Guano: United Kingdom, 15 tons; Seychelles Islands, 250 tons; New Caledonia, 1,603 tons; Ocean Island, 750 tons.  
 Phosphates not specified: United Kingdom, 112 tons.  
 Basic slag: United Kingdom, 20 tons.  
 Sulphate of potash: Germany, 122 tons.  
 Muriate of potash: Germany, 4 tons.  
 Potash salt: United Kingdom, 200 tons; Germany, 60 tons.  
 Kainit: United Kingdom, 150 tons; Germany, 60 tons.  
 Sulphate of ammonia: Victoria, 5 tons; New South Wales, 12 tons.  
 Nitrate of lime: Norway, 5 tons.  
 Gypsum: South Australia, 676 tons; New South Wales, 10 tons.

*Invercargill.*

Bonedust: New South Wales, 171 tons; Bengal, 1,300 tons.  
 Bone char: New South Wales, 47 tons.  
 Blood and bone: New South Wales, 525 tons.  
 Superphosphate: United Kingdom, 400 tons; Victoria, 2,060 tons; New South Wales 1,545 tons; Japan, 40 tons.  
 Guano: Christmas Island, 1,689 tons; Malden Island, 2,690 tons; Seychelles Islands, 741 tons; Surprise Island, 2,828 tons.  
 Basic slag: Belgium, 90 tons; Germany, 70 tons.  
 Sulphate of potash: New South Wales, 8 tons; Germany, 5 tons.  
 Kainit: Germany, 685 tons.  
 Potash salt: Germany, 220 tons.  
 Sulphate of ammonia: United Kingdom, 40 tons; Victoria, 5 tons; New South Wales, 75 tons.  
 Gypsum: Victoria, 55 tons; South Australia, 305 tons.

SUMMARY.

The following is a summary of the kinds, quantities, and values of the various fertilizers imported into New Zealand during the year ended 31st March, 1911.

Description.	Weight. Tons.	Value. £
Bonedust .. .. .	11,058	61,893
Bone char .. .. .	143	494
Bone phosphate .. .. .	326	1,096
Blood and bone .. .. .	975	5,595
Basic slag .. .. .	8,670	28,231
Superphosphate .. .. .	27,442	99,477
Guano .. .. .	15,858	41,756
Rock phosphate .. .. .	105	408
"Mineral earth" .. .. .	60	150
Phosphates, not specified .. .. .	402	1,217
Sulphate of potash .. .. .	792	7,349
Muriate of potash .. .. .	55	634
Kainit .. .. .	1,882	5,946
Potash salts .. .. .	548	5,055
Gypsum .. .. .	3,369	4,120
Sulphate of ammonia .. .. .	227	3,055
Nitrate of soda .. .. .	247	2,549
Nitrate of Lime .. .. .	10	104
Turnip-fertilizer .. .. .	260	905
Grain-fertilizer .. .. .	38	206
Jadoo .. .. .	1	17
Unenumerated .. .. .	2	25

## COST OF LIVING.

## A FRENCH OPINION.

THE question of the price of edible produce, particularly of meat, occupies to a large extent the minds as well as the insides of those who are affected by it. Inquiry into questions of this nature is generally referred to the Minister of Agriculture, but he is too much inclined to occupy himself in the first place with the agriculturist, forgetting that four-fifths of the French people suffer in regard to satisfying their needs in this respect. There are several points for consideration. First of all, questions of national food-supply should be made the subject of study by an Upper Commission, composed of members selected on the one hand by the Minister of Agriculture, and on the other by men understanding the requirements of the consumers. These latter require to be represented and supported. As a result a solution should be found which, while satisfying the needs of agriculture, affords to all facilities in regard to requisite food-supplies.

One is always talking—and justly so—of the working-man. But what one too readily forgets is the fact that by the side of these there are clerks, small tradespeople—in a word, all those who, in France, have only limited resources at their disposal: and this class is legion. Assuredly agriculture ought not to be neglected. It represents our prime means of sustenance, and it is essential that it should be encouraged. With this aim in view, it is desirable to provide for it a connection among the wealthier classes—these will not become insolvent—and, further, to facilitate the exportation of its products. There is an opening for agricultural produce which must not be ignored. Advancement on these lines should be kept constantly in view. Yet one must not forget that the consumers have their special needs. They require to live at the cheapest rate. One must not sacrifice their interests to those of the former class, as has been done for a long time past. To this end it is desirable to face the abolition of the prohibitive tariff which strikes at the entry of frozen meat. The importation of such produce should be encouraged. This is a solution which sooner or later must be reached. Why put off the moment of bringing about this useful benefit? It is the public welfare which is thus being trifled with. Let us bear in mind in reference to this subject that in England the question of the dual supply of meat has also arisen; yet in spite of the enormous importation which there goes on of frozen meat from other countries, the meat-supply furnished by the local farmers maintains its superior and remunerative position.

—Translated from "*L'Hygiène de la Viande et du Lait*," by H. A. R.

## THE HEMP INDUSTRY.

W. H. FERRIS.

THE hemp which came forward for shipment last month was of a less satisfactory character than that of any month during the past season. This, however, was the fault of unfavourable weather-conditions. Heavy rains had in many cases flooded the bleaching-paddocks, with the result that the milling of the fibre was not only delayed, but a large percentage of it was discoloured. The strength was thereby affected as well as the colour.

With the advent of winter the majority of the mills have closed down. More plants will, however, continue operations right throughout the year than is usually the case.

Late shipments show that stripping is still being maintained at an excellent standard. Very little bruised and broken fibre is coming to hand, the bulk of the lines graded being of a good spinning standard. An improvement in the tails of the hanks has been noticeable, due, however, more to the fibre having to remain a long time in the field and thereby enabling the tails to be scutched more effectively than to improved work in the scutching process.

Judging by the care being taken by some millers with stripper-slips, this by-product promises to become an important item of export during the coming season. Improved methods for dealing with the slips are already in progress, while others are in contemplation. One advance made is the drying of the material on wires instead of on the ground.

A newly formed company is experimenting with an improved process of dressing phormium-fibre. Tests are being conducted at a Foxton mill, and the experimenters are sanguine of success.

A trial with the automatic scutcher of Messrs. Suttie and Wynyard proved very successful. One or two small details have yet to be improved upon.

Prices are steady, but little business is being transacted owing to the limited winter output. Tow continues a scarce commodity, and is still in great demand.

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Lucerne bread, cake, and biscuit were handed round at a recent show in New York State.

## THE APIARY.

## NOTES FOR AUGUST.

F. A. JACOBSEN.

## MAKING HIVES: DOES IT PAY THE AVERAGE BEEKEEPER?

I HAVE received many inquiries, both verbally and by letter, in reference to the above subject. Beekeeping is becoming more and more popular, and the large increase in the number of hives used is attracting the attention of woodwork-manufacturers. Quite a number of these have taken up beehive-making as a side-line, yet some of them do not make the hives to the satisfaction of many beekeepers. The reason may be ascribed to a lack of knowledge of bee-life. By this term I mean the habits of bees under certain conditions and in certain districts. One kind of frame would suit a certain district admirably, yet would be of considerable inconvenience in another.

The first thing the amateur should consider is, does he possess sufficient knowledge of bee requirements to enable him to make them correctly? The next thing is for him to find out if he has sufficient mechanical knowledge to work a crosscut saw and a planer—power must be at hand to drive these machines. He must also be able to buy his timber at a cheap rate. All these considerations must have due thought before arriving at a decision; and to the uninitiated I would remark that the best knowledge is gained by experience. Mistakes are always liable to occur even with the most careful; and, in order to keep up to date, changes may have to be made from one style of hive to another. For instance, a beekeeper running a ten-framed hive may desire to adopt the twelve-framed, or he may decide to run his apiary for comb honey in place of extracted. Many changes will certainly be made during a number of years, and it is advantageous to have tools at hand to do this work.

The hive principally used to advance bee-culture in the Dominion is the one planned by the veteran American beekeeper Mr. Langstroth, with modifications continually being made to bring it up to date. The Langstroth ten-framed hive has become popular over all parts of the world. It sometimes occurs, however, that in certain good beekeeping districts it has been found rather small; and in those cases the number of frames has been increased to twelve, the remaining measurements



of the hive being the same as those containing ten frames, with the exception that the supers are wider.

All these matters considered, and presuming a beekeeper wants first-class workmanship and an accurate fit of the interchangeable parts, the question arises, how many hives are required? It would not pay an apiarist in a small way to purchase machinery, and to make hives by hand is a long, tedious process. I would, therefore, advise that all small beekeepers procure their goods from some reliable maker who will give them satisfaction. The price for a good article does not prohibit making these purchases, and any improvements he may desire could be made at a cheaper rate by the manufacturer than by himself. The makers supply hives in the flat, and all the beekeeper has to do is to nail them together and paint them. This is a good system for a man who is combining beekeeping with some other industry or has no leisure time for hive-making. For a person who is running several apiaries and who devotes his whole time to the industry the case is different. It is essential for him to know something about hive-making, and he spends the winter in repairing hives and effecting improvements. He probably wants to make up a hundred new hives for the following season, and so he sets his engine to do the work. He buys a fairly large quantity of timber in one lot and gets it cheaper than the man who buys a small quantity; consequently it pays him to manufacture to his own satisfaction. Perhaps the best kind of timber to select for hive-making is white-pine. It has the advantage of being light and easily worked; when painted it is very durable, and it withstands well both hot and wet weather.

#### MATING-BOXES.

Now is the time for getting everything prepared for the coming season. Not of the least importance is preparing for queen-rearing and mating. The best mating-boxes are made the size of ordinary supers and divided into three compartments. The divisions are made in various ways. One way is as follows: Two saw-cuts are run from top to bottom, about  $\frac{1}{4}$  in. deep, on the inside of each end, and a division of tin is slipped down in the grooves so made. Another way is to tack two sets of cleats at each end, so that a thin partition of wood may be slipped between. Two of these division boards divide a hive-body into three compartments, and the entrance to each is made by boring  $\frac{3}{4}$  in. holes at the bottom of each compartment, one on each side and one in the middle, making three entrances to the hive instead of one.

When the hives are not in use for mating-purposes the divisions may be slipped out and the super used in the ordinary way. These mating-boxes have an advantage over all others in the matter of heat-con

servation. The partitions are so thin that the three lots of bees on their three combs help to keep each other warm. I have seen queens held over all the winter in these boxes and each nucleus built up to a ten-framed hive in the spring. It is advisable to place strips of matting of suitable size over the single compartments, so that the other two are not disturbed when one is being manipulated. The ordinary hive-cover is used over the whole.

#### FOUNDATION IMBEDDING.

There are a great number of methods employed in imbedding the supporting wires into the wax foundation; the most common is what is called a wax imbedder, and is on the principle of a tracing-wheel, such as dressmakers use. Slots are filed round the edge of the wheel, which is run over the wire on the foundation, thus imbedding it. This method is not the most satisfactory; a slight jar on the frame will set the foundation loose again, and it is not always convenient to handle new frames carefully. A system which is coming into use now is to melt the foundation on to the wires, thus uniting the two strongly. A piece of  $\frac{1}{2}$  in. round iron, about 4 in. or 5 in. long, is tapered by a blacksmith to a curved blunt point; file a nick in the point to run along the wire, and the tool is complete. When using it keep the point heated over a small lamp. The work is done in the usual way by placing the frame with the foundation on the imbedding-board and running the hot point of the iron over the wire. The plan works simply and efficiently, and is perhaps a little quicker than the tracer system.



A WAIRARAPA OUT-APIARY.

## ORCHARD WORK FOR AUGUST.

W. A. BOUCHER.

### PLANTING.

IN many localities the month of August provides excellent opportunities for orchard planting owing to favourable weather-conditions prevailing. Every advantage should be taken of such opportunities as warm days and dry soil afford, and all planting completed if possible before the end of the month.

### PRUNING.

If the pruning has not already been finished, this important work should be continued, and as far as possible completed, before the end of the month.

### TREATMENT OF YOUNG TREES.

*Root Pruning before Planting.*—In lifting the trees from the nursery rows, the roots will have been considerably shortened, and sometimes bruised or roughly spade-cut. Before planting, careful examination should be made, and, if necessary, in order to remove any ragged, bruised, or broken ends, the roots should be cut still further back with a sharp knife or secateurs, as this will greatly facilitate the production of an early period of a sound and healthy root-system.

*Top Pruning.*—It is absolutely essential that all young trees should be cut back either before or immediately after planting. As many growers who plant for domestic purposes only too frequently overlook this, it may be as well to give at least two of the most important reasons why it should be necessary to do so. Usually, when a tree is received from a nurseryman, it will be found that the top growth of the previous season is intact, while the greater portion of the roots have necessarily been removed when lifting from the nursery rows for transplanting. If set out in this form, with spring weather a large number of buds will commence to swell and require a flow of sap to feed them long before a fresh root-system has been formed sufficiently adequate to take in from the soil the plant-food required. The trees

NOTE.—The limb of the pear-tree shown on the following page is of a tree in the orchard of Mr. Kurtzhals, Stoke, Nelson. It affords a good demonstration that it is not necessary to wait an indefinite period for a pear-tree to come into heavy bearing.

so planted, if they do not actually die, frequently so suffer in vitality that they never fully recover. Moreover, in the case of well-grown nursery stock it is no uncommon thing to receive trees with a growth of from 4 ft. to 6 ft. above the soil-level. If left unpruned, if the tree survived, the main-branch crown would be formed at a height above ground that would be far from desirable, as affording undue exposure to heavy winds, together with increased difficulty in spraying, pruning, and gathering the crop. Therefore, unless a tree has been properly branched in the nursery, to cut back to the height of one's knee is suggested—partly to secure a main-branch crown at a distance from the surface of the ground convenient for horse cultivation, and yet low enough to enable the orchardist to build up an orchard of uniform, compact, sturdy trees that will carry their fruit on well-set limbs, which will not be readily affected by the wind, and partly to restore the balance between top and root, and check the top from starting into free growth until the shortened roots have had time to send out fresh feeding rootlets to take in plant-food from the soil to supply the necessary flow of sap for the young growth that will be formed.

#### CULTIVATION.

As a general rule, in order to secure the best results in the development of the trees and the production of fruit of good size and high



quality, regular and thorough cultivation of the soil is most essential. If, as has been previously suggested, the orchard has been ploughed in the autumn, it will now be necessary to cross-plough and work down to a condition of fine tilth with disc or tine harrow. This should be followed by the working of the soil at regular intervals during the summer, either with a single or a two-horse cultivator, with the object of preventing a growth of grass or weeds, and also, in the event of dry weather setting in, retaining in the soil the moisture that the trees require for encouraging summer growth and perfecting the crop of fruit. In most parts of New Zealand the average winter rainfall is abundant and well distributed, but it is no uncommon occurrence for dry weather and drying winds to set in during spring and early summer. If thorough cultivation of the soil has been maintained, abundant moisture for the needs of the trees and crops will be retained owing to the soil-mulch on the surface; but if cultivation has been neglected and the soil becomes compact, capillary attraction promoted by this condition will speedily bring the moisture from the subsoil to the surface, to be evaporated by the sun's rays or carried away by dry winds. In this connection it may be as well to point out that thorough cultivation is intended to include thorough pulverization of the soil, for in the case of clay lands, especially if the surface soil is left in a rough condition or full of clods, one of the principal objects of summer cultivation—*i.e.*, retention of moisture—will be defeated, for capillary attraction and evaporation from the subsoil will still take place, although not quite so rapidly, perhaps, as if there had been no cultivation. Horse-implements for the commercial and hand-implements for the domestic grower have been so far perfected that complete and thorough cultivation can be carried out at a minimum of cost and labour. In the commercial orchard of average size the practice will be to plough as much of the land as possible between the rows of trees, using a pair of horses, and finishing the strips along the rows that cannot be so worked with a single horse and a light plough. If the bridle for the latter be made sufficiently long, it will be possible to run the plough quite close to the trunks of the trees without injury to the limbs or twigs, thus reducing, as far as may be, the amount of hand-labour required for digging or hoeing to make cultivation of the soil complete, it being, for many reasons, not desirable that strips along the rows or squares immediately around the trees should be left unworked.

For breaking up and pulverizing the soil after ploughing, an extension disc harrow will be found of great service, the extension principle allowing the implement to be worked close in to the trees, while the team required to draw it will be sufficiently far away to avoid injury to the limbs or trunk by harness or otherwise. With the same object in view many growers now use the two-horse cultivator, with an exten-



sion outside the wheels, to promote the cultivation that is required after ploughing and pulverization have been accomplished.

### SPRAYING.

Apples, pears, and English plums infected by scale or red spider that have not yet been sprayed should receive attention as soon as possible. Emulsified red oil is now generally recognized as being the most satisfactory remedy for these pests, as well as assisting materially in keeping woolly aphis in check. It is to be noted, however, that spraying with the winter formula of this mixture must be completed before the buds commence to swell, in order to avoid the risk of doing serious injury to the buds and trees.

*Peaches and Nectarines.*—As soon as the buds commence to swell spray thoroughly with the Bordeaux mixture 10-10-40 formula, in order to protect the trees against attack by die-back fungus and leaf-curl. Care should be exercised to see that the growth of last summer especially receives a thorough coating of the mixture, for the die-back fungus attacks and seriously injures the tender bark and buds of such growth if left unprotected. In order to ensure thorough treatment the trees should be sprayed from the top downwards, and not from the trunk upwards, as is sometimes the case.

*Cherries.*—When the buds show signs of swelling spray with the Bordeaux mixture, 10-10-40 formula, in order to protect the trees against attack by the fungus that causes cherry leaf-scorch.

*Lemons.*—Spray as soon as the main crop has set with the Bordeaux mixture, 4-5-50 formula, as a preventive against verrucosis and grey scab. For scale insects on lemons and oranges spray with the kerosene emulsion when the young scale are on the move.

*Strawberries.*—Spray with the Bordeaux mixture, 4-5-50 formula, in order to check on the older, and prevent on the younger, foliage the attack of leaf-spot fungus, which is prevalent at this season of the year.

*Gooseberries.*—Spray while the bushes are dormant with the Bordeaux mixture, 10-10-40 formula, to prevent attack by leaf-spot fungus, which in many instances has caused entire defoliation of the bushes and loss of crop.

### ROOT-FUNGUS.

In localities where this fungus is troublesome, attacking more particularly apples, plums, and gooseberries, apply a soil dressing of sulphate of iron in the proportion 1 lb. to 2 lb. per tree and  $\frac{1}{4}$  lb. to  $\frac{1}{2}$  lb. per bush according to age, which should be sprinkled over the surface near the trunk or stem and lightly worked into the soil.

## CULTIVATING THE ORCHARD.

### EFFECT OF GRASS ON TREES.

FRUITGROWERS of the Dominion will be interested to know that the principle of thoroughly working the soil of the orchard, which is now generally accepted in this country as essential to the best results, has been proved to be of distinct advantage over allowing grass to grow between the trees (as in the old way of conducting fruitgrowing) by experiments extending over sixteen years conducted at Woburn Experimental Fruit Farm, of England.

In their thirteenth report on the experiments the Duke of Bedford and Mr. Spencer U. Pickering state that the extent of the effect of grass on the orchard depends on certain conditions, such as character of soil, age and kind of tree, and the rate at which grass spreads over the area cleared when the tree is planted; but in all the experiments, extending over sixteen years, and carried out at several centres, there was only one case in which the deleterious action of the grass was not marked. In the majority of cases it was considerable, and in many it caused the death of the tree. In none of the experiments has any recovery from the effect been noticed, except in cases where the roots have extended beyond the grassed area into cultivated ground. Ten years' records of the trials at Ridgmont show that the value of the fruit obtained from dwarf apple-trees grown in grass was only 7 per cent. of that obtained from trees grown in cultivated ground exactly similar in all other respects. It is, however, pointed out that the majority of the trials were so planned that the effect of the grass would be exercised to a maximum extent—the trees were young, and the grass did not spread gradually over the ground, but seed was sown (or turf replaced) immediately after the tree had been planted. Where the grassing-over proceeds gradually, the trees apparently accommodate themselves to the altering conditions, and suffer much less than when the grass is actually sown over their roots. The fact that a tree has

**F**REEDOM from disease in one season is a poor excuse for failure to guard against it in the future. Eternal vigilance against blights and pests is essential if success is to be achieved.

become well established in the ground before the land is grassed does not, however, prevent it suffering.

Standards on the free stock and dwarfs on the Paradise were almost equally affected, though some varieties of apples were less affected than others, owing, doubtless, to their vigour of growth. Pears, plums, and cherries were also affected, though in the case of these trees the standards suffered less than the dwarfs.

One of the most striking facts is that the action became noticeable as soon as any of the roots of the tree had entered a grassed area, no matter how small was the proportion of such roots to the whole root-system of the tree.

It is suggested that in some soils, where the effect produced is not great, grass might be advantageous from a commercial point of view, for the check given to growth tends to increase the cropping, and grass affects the colouring-matter of all parts of the tree, generally resulting in a high colouring of the fruit.

Forest trees appeared to be affected by grass in the same way as fruit-trees when grass was sown immediately after planting, though in the case of conifers on a light soil the effect was much less than with other trees, and some recovery gradually took place.



A GOOD STYLE OF VINERY.

## THE FARM GARDEN.

W. H. TAYLOR.

### VEGETABLE GARDEN.

BEFORE this article is published spring work will be well started in most places. I have before said that there should never be undue haste in getting seed into the ground when the latter is not in a fit state to receive it, while there should be reasonable prospect that conditions will remain suitable for growth. "Make haste slowly" is very good advice in this connection. Seed or plants put out in sour ground seldom thrive. Remember, a single swallow does not make the spring, nor do a few fine days. The exact time to sow or plant can be determined only by local experience. My own experience has abundantly proved this. On the slopes about Wellington City the first week in July is a busy time with seed-sowing. My onion-seed was always in the ground on the first fine day of the month, and that was necessary, because shadows from hills made the hours of sunshine less in number than at the place where I now live. Here at Weraroa I must keep my seed till August, and sow at a time when my former crops would be 6 in. high. Early sowing in damp situations often results in a lagging growth, until increasing length of days and rising temperature come to the rescue. Now, lagging growth is not a good thing, and it is seldom desirable results follow. Vegetable crops should be made to grow all the time. Do not sow or plant till you can be reasonably sure that growth will go on uninterruptedly. Many crops may be easily ruined by being stunted in their early growth.

The practice, which some have, of raising seeds in boxes or pots, is one fraught with much danger, although not necessarily so; but it frequently leads to loss. Cauliflower-seed, for instance, raised in a box often produces stunted plants. This because they are left there too long. This is very likely to happen, with the result that after being put out the plants usually button prematurely. The remedy would have been to prick the plants out as soon as they were fit to handle. Leeks also are bad things to raise in boxes; those so raised more often than not bolt to seed about the end of summer. It is seldom wise to raise seeds in this way; better wait till the soil is fit, and sow them in the open ground, which is their natural place. These remarks are intended to show the need of the exercise of observation

and intelligence, and to emphasize the fact that, when artificial means are employed, an additional degree of skill is also necessary. I have for many years been against employing artificial means when the same results can be obtained without them. For that reason I do not approve raising marrows, pumpkin, and kindred seeds in boxes under glass. There may be no harm in doing it, but it is labour wasted; the seed comes freely in the open at the right time, and fruits come nearly always as early. I do not believe it right to sow tomato-seed so early as most folks sow it. Where frosts are probable, as here, until the beginning of November, it is useless to put plants out before the first week of that month. By sowing in mid-August the plants will be ready and in good condition when wanted. Early planting, where weather is almost sure to be inclement, is a sure way to get late fruit, because plants, if not lost, become enfeebled.

*Routine Work.*—Celery-seed should now be sown in boxes to secure early crops. In places where it is not convenient or desirable to grow successive crops, it will be best to delay the sowing for a month, and arrange to get the crop for winter use, when it is of greater value than in summer or autumn. If successive crops are to be grown one variety selected should be White Plume; this is valuable for summer use only: much cold rain, or a little frost, crumples it up. For the main crops there are white and red varieties; both should be grown, for the sake of variety. Most people agree that the red sort is best in flavour; the red is, of course, blanched out, or, at most, only a tinge of red on ivory white is shown when the leaves are blanched. Celeriac, or turnip-rooted celery, is seldom grown. This is a pity, for it makes a most excellent dish when stewed, and as a flavouring for soup, &c., it is very palatable. Cultivation is the same as for celery in the initial stages. Sow seed now. A small quantity of carrot-seed of a short-horn variety should be got in at once. Lettuce and radish seed may be sown, and plants of the former put out. Early in August sow a little turnip-seed. Turnips remain fit for table use but a very short time during summer; therefore sow but little at a time. For the earliest sowing I like Early Milan, which is a variety that makes very little top. The bulbs form in perfect shape at once; they look at first like radishes, and have been mistaken for them. They are fit for use when quite small. As soon as the first crop is properly fit for use, sow again; this time and hereafter sow Snowball. They take from seven to eight weeks to come into use from date of sowing, and such an interval should therefore be allowed between each sowing during summer. The breadth sown is sufficient to last that time, which is as long as they remain fit for use. I find, if the ground is fairly supplied with humus, got by digging in the remains of crops, weeds, &c., a sprinkle of superphosphate



and bonemeal, or basic slag, is sufficient manure for turnips. The same manures also answer for carrots; these should never be sown in soil freshly manured with stable dung, as it causes them to fork and form side roots.

Peas are now to be sown at intervals of two weeks. What are the best varieties perhaps no one is entitled to say, as probably no one has grown more than a limited number of all the varieties extant. I would say, do not grow Stratagem. I discarded that variety fifteen years ago because of its thick skin. Carter's Daisy I consider much overrated; I never found it fill the pods well. Daybreak, Carter's Springtide, English Wonder, Sherwood have all proved good, both as first and second earlies, while the best main crop I at present know is Sutton's Dwarf Defiance. When selecting peas, never choose a variety that grows more than 36 in. high, unless you can provide them with stakes; for, if the haulm is long and has to lie on the ground, it not only requires an inordinate amount of ground, but half the crop is lost, because smothered by the haulm. Dwarf Defiance requires about 33 in. between the rows, the previous-mentioned sorts 30 in.

Asparagus: If previous advice was taken, the bed has been treated to a coat of stable manure. At this time all the rough stuff remaining should be raked off—it will do to dig in elsewhere. If the surface is at all close it should be lightly forked over; give a dressing of salt, 4 oz. per square yard. This is sufficient to kill slugs and seedling weeds. Or a dressing of nitrate of soda, half above quantity, may be given if weeds are not troublesome; the nitrate will kill slugs, but not weeds. It is a powerful fertilizer for asparagus. If there are any wood ashes from rubbish fires available, a good coat of them may be given with considerable advantage. Mix a 6 in. potful of bonemeal with each barrow-load. If ashes are not available perhaps sand may be. Though inferior to ashes, as it has no manurial properties, it is good for keeping the soil open and clean. But be particularly careful not to use sand that is too sharp, or that contains broken shell visible to the eye; by doing so you incur the danger of destroying the bed altogether. This happened to myself once in my young days. When the tops were allowed to grow up and waved in the wind, the shelly sand applied silted down round the stems; these being tender below ground, the shell cut them. The bed was totally destroyed; scarcely a plant remained alive.

Rhubarb of the summer kinds may be planted in rich ground. Clumps with from one to three good crowns are better than larger pieces. When rhubarb has been long undisturbed it usually gets poor, because when a large number of crowns are crowded together they get weak. For this reason it requires lifting and splitting up

every few years. The market-grower plan, which may be considered the best, because most profitable, is not to pull anything from the crop the first year after planting; then pull properly for two years; then lift and divide. Planting is so arranged that another bed is ready for use while the last planted is rested.

Cucumbers in frames: Growing cucumbers in frames is a quite simple matter, and with a little care a supply can be secured that will make it well worth while where cucumbers are appreciated; more particularly so, as the necessary hotbed can be utilized for other purposes for a time, such as striking cuttings and raising seed. In the first place it is important that the manure be of a proper kind, and properly prepared. It is also wise to make two operations of it—viz., a small temporary bed to raise the plants, and the larger one to grow them on. The manure should be clean, with plenty of straw. A couple of dray-loads will make the small bed. The manure should be turned over several times before making up the bed, and all knots of straw shaken out. Long preparation is not necessary for the small bed, as it is not wanted long. If the small bed can be made up in a plant-house it is a great advantage. The bed should not be made up until the rankness is out of the manure and the straw has taken on a brown colour, showing fermentation is in progress. Cover the manure with a few inches of coal ashes or light soil to absorb rank steam. The seeds are to be sown in pots. I prefer three in a 5 in. to one in a 3 in. pot, but either will do. I like fibry loam without admixture to sow in, as one point towards getting a sturdy plant. Plunge the pots of soil in the bed the day before putting in the seed, so as to warm the soil. Press the seed in to the soil in an upright position, thin end downward. The seed should be up in three or four days. Care must now be taken not to get the plants drawn; give them all the light they can bear, and largely this will be in proportion to what they are started with. Success can only be attained with stocky, robust plants; they cannot be this if much shaded. When the roots have run through the soil, the plants will be ready for a shift. If three in a pot, separate them and pot each in a good 3 in. pot, to be shifted again when ready to a 5 in. one; or, if in a 3 in. to begin with, shift straight to a 5 in. Always warm the soil by laying it on the bed before potting off. In the meantime get manure ready for the final bed. It will take from ten to twelve loads to make a bed for a two-light frame. It should take a fortnight to prepare the manure, shaking it over twice a week. When making the bed, beat it down well with a fork as each layer is put on, but do not tread it down. Make the sides a foot higher than the middle, for the weight of the frame will send it down. When the plants are ready to put out, place about a bushel of turfy loam under

the centre of each light, level the top, and plant two plants on each heap. Further details of treatment will be given in next article.

### FLOWER GARDEN.

In most places planting anything in the way of trees or shrubs should be completed as soon as possible. Though planting may in some places be carried out much later, there is seldom any advantage in delay; expediency may render late planting advisable, or excusable, but the advantage ends there. For, unless the roots get a good hold on the ground before hot and dry weather sets in, there will be very little summer growth. It is gaining a good summer growth that makes autumn planting the best; early spring is the next best time.

Roses may be planted still, for another month in fact, and good results obtained; but this can scarcely be applied to plants that were not lifted and heeled in some time ago. When this has been done the bushes will have made both new roots and new shoots by this time, and, if taken up and replanted with as little exposure of the roots as possible, they scarcely feel the check. A very large number of herbaceous plants may be transplanted at this time, as well as most of the lily family. It is not advisable to transplant lilies very often. Unless they show signs of deteriorating they should be left alone, provided there are no special reasons that render their removal desirable. If this is the case, little harm will be done, for they are very accommodating in that respect. All the strong-growing lilies, the *speciosum*, *tigrinum*, *longiflorum*, *candidum*, and *auratum*, require deep planting. A necessity with deep planting is a deep soil, well drained, either naturally or artificially. The largest bulbs of *auratum* should be put in a hole nearly or quite 18 in. deep. Smaller bulbs, including all those mentioned, require a hole 12 in. deep at least. This may appear an excessive depth, but a little observation of their habit will show that it is not. Above the bulbs, and out of the base of the new stems, a very strong set of roots always springs. These are very necessary to the well-being of the plants; it is obvious that if the bulbs were not planted deeply, these roots would be near or on the surface of the soil, and consequently unable to do the work for which they are designed. This is so well recognized by cultivators that, when bulbs of lilies are grown in pots, only a little soil is put in at the time of potting the bulbs, which are consequently very low in the pot. They are allowed to make enough growth to clear the top of the pot, which is then filled up with soil to enclose the stem-roots that will be already pushing out into the air. The class of plants referred to as herbaceous include the various *spiraeae*, of which there are a number of distinct types, as *japonica* and its varieties, *palmata*, *filipendula*, *astilboides*, and others. *Heuchera*, perennial *campanulæ*, as

*persicifolia*, *rotundifolia*, *isophylla*, and others, *francoa ramosa*, *scabiosa caucasica*, *doronica*, *saxifrages*, *helenia*, *rudbeckiæ*, *delphinia*, *dicentra*, *corydales*, Japanese iris, pæonies, phlox, penstemons, &c. Japanese iris are deservedly popular plants, and are sure to give satisfaction, provided they are grown in good soil with a sufficiency of moisture; their proper home, doubtless, is in semi-boggy land, but they do well in any good soil. Herbaceous pæonies are very desirable plants, of easy culture, and long-suffering. They give little trouble when once established in good soil, and their flowers are numerous and beautiful. Quite different is the modern race to the old-fashioned pæony-rose. The tree pæony Moutan is also a fine thing, with enormous double flowers of a pleasing shade of light rose; it is shy flowering only when not properly fed; it requires rich ground. Carnations should now be planted. The ground for them should have been ready some time; if not, it should have some good stable manure dug in deeply, leaving none near the surface. They like a firm but not stiff soil. If inclined to be stiff, it should be loosened with sand, burnt earth, leaf-mould, or anything of the kind available; a good dressing of soot worked in the top spit will be of great service, and a sprinkle of bonemeal or basic slag may be added. Before planting tread the soil down as hard as can be done. Put the plants in rather deeply, so that the bottom grass rests on the surface of the soil; press the soil firmly about the roots. Summer-flowering gladioli may now be planted in well-drained soil in a sunny position. Put the corms 6 in. below the surface.

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## THE WORLD'S GRAIN CROPS.

THE May number of the *Bulletin of Agricultural Statistics* has just been issued by the International Institute of Agriculture in Rome. The figures published in April with regard to the areas sown to winter cereals in the Northern Hemisphere are confirmed in the May number, additions having been made in the form of the areas sown in Italy (wheat, 4,750,000 hectares; rye, 122,000 hectares; barley, 245,000 hectares; oats, 500,000 hectares), and the area of wheat abandoned in the United States and Canada (United States 20 per cent.; Canada, 31 per cent.). The weather during April has had a somewhat unfavourable effect upon vegetation, with the result that development is in general rather backward. The condition of the crops, however, on 1st May was for the greater part good, except in the United States, where the condition figure was below that of the corresponding period in 1911 (winter wheat 93 on 1st May, 1912, as against 100 on 1st May, 1911; winter rye 98, as against 100). The germination of spring wheat, rye, barley, and oats has been, on the whole, uniform, except in Austria.

The export of phosphate from the West Carolines (German Protectorate) quadrupled last year, the export in the year 1910-11 being valued at £46,847. In German New Guinea the export of phosphate in 1910 was double that of 1909, the value of the export in the former year being £428,025.

## THE POULTRY INDUSTRY.

F. C. BROWN.

### EXPORT TRADE.

THE development of an export trade in poultry is often discussed without the fact being considered that the first essential is a supply of the desired material necessary to make such a trade profitable or even possible. In regard to table-poultry the local demand is not only unsatisfied but is wretchedly catered for. Were the right class of bird available in any number a considerable demand could be developed in the Dominion itself for table-poultry; in fact, even if the breeding of birds suitable for the trade were now taken up energetically by poultry-keepers it would be some years before the local trade could be placed on a good footing, and the proper demand, which has had to be created, could be satisfied. Then it would be time enough to talk of an export trade. The best means of providing for this future contingency is encouraging our small farmers to take up the breeding of general-purpose stock, so that store birds of the right stamp may be procurable by the fatterer and exporter. The farmer must be given the opportunity of securing general-purpose breeds at reasonable rates, so that the production of these types may be encouraged and extended. This the Department is doing, and is at present the main agency in the Dominion for laying this necessary foundation for a proper trade in table-poultry. It is quite useless discussing the export trade at the present time. When farmers have taken advantage of the Department's present offer of supplying sittings of the general purpose breeds at a low rate, and are supporting private breeders who are specializing in these types, it will be time enough to consider the proposal.

### AUGUST WORK.

August is one of the busy months on the poultry plant. It is then the great bulk of the heavy breeds should be hatched, and where there is not sufficient incubator and brooder capacity to bring out all the hatchings of the lighter breeds the producing of these should also be then commenced. It is well to reiterate that every care should be taken in selecting eggs for hatching purposes. In the first place, only eggs from birds of undoubted laying-capacity and of sound constitution should be used, while, however good a bird, if its eggs



are on the small side it should not be bred from. Too many of our heavy-laying strains of the present time are producing eggs which are certainly not of a desirable marketable size. Of course, while the whole egg-output of a flock is declining in size it is high time to introduce fresh blood of a strain laying decent-sized eggs; but it is now too late to talk of this for the present season.

It is very noticeable to a visitor to Australia to see the good-sized egg produced by the great majority of White Leghorn flocks of the Commonwealth. The size of the egg is there considered almost of as much importance as the number produced. No doubt the weight clauses adopted in the laying competitions of Australia have had much to do with this desirable development.

An important fact to be remembered at this time of the year is that if healthy chicks are to be produced the breeding-birds must be fed in a proper manner. A good healthy germ cannot be secured from a bird that is poorly fed. Green stuff especially, as well as clean water, should be kept constantly before the breeders, and these should also have ample opportunity for exercise. They cannot be treated too well. In some cases it is necessary to give a variation of feed in order to maintain the fertility of the breeders. Sound and liberal feeding will give good hatches, healthy chicks, and robust stock. In selecting breeders too many attach first importance to certain methods of choosing the layer, methods which are more often not only misleading but are of no practical use. The high-class layer is of a distinct type, which stands out conspicuously to the man who understands the business, without the necessity of his touching the bird.

#### FRESH BLOOD.

On a recent visit to Australia I secured a number of birds, seventy-one in all, to provide fresh blood for the poultry plants of the Department. Special attention was paid to the heavier breeds, the development of which to a utility standard is now the chief concern of the poultry plants of the Department. The birds purchased include Black Orpingtons, White Orpingtons, White Rocks, and White Wyandottes. Some White Leghorns and Black Minorcas were also obtained, as well as several Pekin Ducks. The Black Orpingtons, Pekin Ducks and some White Orpingtons, White Rocks, and White Leghorns came from South Australia. The White Wyandottes, some of the White Rocks, White Orpingtons, and White Leghorns were bred in Victoria; and New South Wales provided the Black Minorcas.

Generally the birds were selected on breed, utility, and constitutional points, and I am satisfied I secured stock which will strengthen the utility character of the flocks of the Department. The birds

landed in good condition. Females were secured as well as males; so that, independently of keeping the Australian strains separate, stock will be available for experimenting in crossing direct on our own stock. The new blood will be introduced by degrees, and will be crossed with the local blood to a very limited extent for the first season, in order to decide whether the union will have the desired effect. As it is the Department's policy to stock nothing but self-coloured breeds, only black and white birds were imported.

#### AUSTRALIAN IMPRESSIONS.

I have continually pointed out that constitutional points are the first essential in a breeding-bird, and during my visit to Australia it was gratifying to me to find that the word "stamina" was the first word in the mouths of the leading poultry authorities of the Commonwealth when the question of breeding was being discussed. They also attached due importance to type in selecting the layer. I noticed that the Redfern birds, which put up the world's record at Adelaide in the last test, were still laying at the time of my visit, while several had never moulted. They had constitution stamped all over them. I believe a pen of equal quality could have been picked out from a bunch of the sisters on the same plant. Mr. Hart, the Government Poultry Expert of Victoria, who is a firm believer in type in judging utility poultry, selected the Redfern pen for the South Australian test. It is a striking testimony to the principle of selecting on type that the six pullets were able to lay an average of 264.83 in twelve months, and thereby put up a world's record. The breeder informed me that he had obtained 90 per cent. of his points in breeding and selection from Mr. Hart, who had also imbued him with the great importance of placing constitution as the first consideration in breeding-operations.

The world's champions are not small; they are alert birds true to Leghorn type and with a fair amount of timber. A noted feature about them is the clean face—in fact, they conform as nearly as a bird well could to the description of the layer contained in the issue of the *Journal* of September of last year. All the great layers I saw in Australia had the desired abdominal development, being deep in the hinder part of the body with great width, the legs standing wide apart.

Australian breeders have a great advantage in their climate. I am convinced they can get more out of their birds without a heavy forcing diet than we can. The general rule is to feed a moist mash in the morning. Great importance is attached in the Commonwealth to the feeding of green stuff. Almost every little plant has a patch of lucerne, and this is mostly chaffed before feeding.

## MARAUDING VERMIN.

It is safe to say that a very high percentage of the chickens hatched each year is lost by reason of cats and rats, to say nothing of stoats and weasels. More particularly is this the case on farms and other places where the chickens are hatched under a hen in unprotected corners. The failure to rear the desired number of chickens is usually put down to bad luck. It is more often a matter of bad management. The obvious policy is to only attempt to hatch the number of chickens that can be properly protected and reared. It will be found cheap in the long run to provide proper coops with runs attached for the birds and their broods. The coops should be so made that they can be easily moved about. They should also be rat-proof, while the runs should also protect the chickens from their natural enemies. A common mistake is to make the run too small. It is not enough that the little ones should be able to stretch themselves. They should have sufficient room to take some exercise, for exercise, if not overdone, is essential to the chicken's sound development.

## DANISH METHODS.

Some idea may be formed of the importance of the Danish movement by the fact that there is an egg-export association, consisting of 45,000 members, who are making every effort to obtain large returns, of which one or two examples may be given. Nine flocks of hens, owned by nine different farmers, produced an average of 147 eggs per hen, while fourteen other flocks averaged 138 eggs. The net profit per hen averaged about 4s. On one farm the flock averaged about 173 eggs, with a return of 13s. per hen; in another case the flock averaged 161 eggs; in a third, 163; and in a fourth, 158 eggs. It is this form of work which is the result of combined efforts on the part of farmers who employ the best laying breeds of fowls, making a selection of the best layers for the maintenance of their flocks.

## THINGS TO REMEMBER.

A lock on the fowlhouse door often produces surprising results in the number of eggs gathered.

Want of eggs when the birds are in a laying condition is often due to egg-eating.

Pieces of camphor in the corners of the nest-boxes will do much to repel lice.

Many poultry-keepers are always complaining of a low price for their eggs. This is too often due to their eggs being of a doubtful nature.

The first step in culling a mixed flock is to choose the hens with a strong constitution combined with laying type.

## CO-OPERATIVE EXPERIMENT RECORD.

## LUCERNE.

## THE CO-OPERATIVE TESTING CAMPAIGN.

G. DE S. BAYLIS.

IN the issue of this *Journal* of last August the Director of Fields and Experimental Farms pointed out the great benefit to be derived by farmers if they could succeed in establishing lucerne upon some portions of their farms. In response some fifty experimenters in the North Island have interested themselves in lucerne this season in co-operation with the Department—thus, nearly two hundred plots have been devoted to inquiring of the soil: “If, without further treatment than ordinary cultivation, it will grow lucerne, and, if not, then if additions of lime or of inoculated soil, or of lime and inoculated soil, or of suitable fertilizers, will enable it to produce this invaluable forage plant.”

These questions are now being asked in the Manawatu, Wairarapa, Rangitikei, Taranaki, Waikato, Bay of Islands, Hawke's Bay, and Auckland districts. Even the much despised punice country and the gum lands are seeking to induce this gold-mine among forage plants to establish itself permanently in their midst.

It is too soon to make reports of a satisfactory nature or otherwise upon a plant which has not yet been in the ground for more than six months at the longest. The close of the second season is the right time to obtain reliable information upon what lucerne has done in a soil and to form some reasonable idea as to its future possibilities therein. Therefore this report is but a brief summary as to where the plots are located, the kinds of soil tested, and the condition in which plots were found when last inspected.

## LUCERNE, 4-PLOT SCHEME.

1 Acre.

$\frac{1}{4}$ acre. — No lime; no soil-inoculation.	$\frac{1}{4}$ acre. — Lime, 375 lb.
$\frac{1}{4}$ acre. — Soil-inocula- tion, 75 lb.	$\frac{1}{4}$ acre. — Lime, 375 lb. Soil-inocula- tion, 75 lb.

A further report upon the individual plots will be best made probably about the time that lucerne starts growth next spring. In the meantime it is sufficient to state that in most cases the lucerne upon the limed plots has done the best. In some instances inoculated soil has been of decided benefit, and its effects are likely to be more noticeable next season. Speaking again, generally, the use of manure has been in many cases of great benefit in starting the young plants.

With reference to soils, a large variety are represented by these experiments. An alluvial soil of medium fineness is the easiest soil on which to establish lucerne, provided there is sufficient depth of soil, and that water at no time in the year stands for any length of

time nearer to the surface than about 3 ft. Much can be done to prepare a soil for lucerne. Soils, superimposed upon a subsoil of a stiffer nature, may be sub-soiled, and before ploughing lime may be broadcasted, so that it may become worked into the subsoil as cultivation progresses. This tends to loosen the subsoil, and to neutralize acidity. This was the method adopted by Mr. J. Hunter, Lower Plain, Masterton. Very light sandy soils would be improved by having either stable manure, or a green crop ploughed in to increase their content of organic matter.

Failure to secure a stand is, in nine cases out of ten, due to the land becoming over-run with weeds, and, since it is hopeless to endeavour to establish lucerne satisfactorily on foul land, it is perhaps better to grow some preparatory crop, as a cleaning crop, for the first season, and to follow up by liming and suitable cultivation, to prepare the same ground for lucerne in the following spring.

*Experimenter: Morris, B., Eketahuna.*—Soil, light friable sandy loam. Has been limed, and a cleaning crop is being grown thereon in preparation for lucerne.

*Experimenter: Hunter, J., Lower Plain, Masterton.*—Soil, medium stiff loam 8 in. upon clay subsoil. These plots were ploughed twice and subsoiled, and well cultivated at intervals. Lime and fertilizers were used. A very fair stand has been secured. Has become rather full of hawkweed lately. After first cutting, became very yellow, but has since recovered.

*Experimenter: Cameron, W., Te Ore Ore, Masterton.*—Soil, alluvial, rather close nature. Ploughed twice. Well cultivated at intervals and rolled. On broadcasted portion 20 lb. of seed were sown per acre, on drilled portion 12 lb. per acre. 10 cwt. lime was used per acre, and  $3\frac{1}{4}$  cwt. of fertilizers. Looking particularly well, especially lot broadcasted. Depth of roots over 2 ft. Very healthy colour. Has been grazed, and is about ready to cut. This experiment forms portion of a 10-acre paddock. Experimenter increasing the area next year.

*Experimenter: Blundell, J. L., Masterton.*—Soil, compact, dark, alluvial, at the foot of limestone hills, bordering a swamp. A light dressing of lime and fertilizers given. Cultivation indifferent. Crop somewhat weedy. Lucerne rooted 2 ft. Very strong plants. Will take complete possession of the ground. Cut once as a mulch, and since out for hay.

*Experimenter: Bryant, W., Kumeroa (4-plot scheme).*—Soil, alluvial, sandy nature. Ploughed, well cultivated at intervals. Light dressing of lime and fertilizers given. Good stand has been secured of healthy colour. Roots, about 15 in. in the soil. Seed, 14 lb. per acre, drilled. Experimenter increasing the area next year.

*Experimenter: Taylor, W. J., Makuri (4-plot scheme).*—Soil, light friable loam, upon porous sandy clay. Ploughed, harrowed and rolled twice. Light dressing of lime and fertilizers used. Roots about 8 in. Little growth made. Position chosen very exposed.

*Experimenter: O'Neale, A. E., Featherston (4-plot scheme).*—Soil, light loam, intermixed with shale and gravel. Sown with fertilizers. Germinated well, but took a long time to establish itself. Is doing better now, and may be a success.

*Experimenter: McLeavey, J. A., Napier Road, Palmerston North.*—Soil, compact, alluvial, on sandy subsoil. Ploughed 9 in. deep. Well cultivated at intervals. Limed at the rate of  $\frac{3}{4}$  ton per acre, and  $1\frac{1}{2}$  cwt. fertilizers per acre used. Germination was indifferent, seed being probably sown too deep. A portion was killed as germinating by grub. Has since been resown, and a good take secured. Land should prove very suitable to lucerne. Colour of crop good.

*Experimenter: Harrison, T., Napier Road, Ashhurst.*—Soil, medium, alluvial, considerable depth on gravel. Ploughed and cultivated. Good take has been secured. Land fairly clean. Seed broadcasted. Lime,  $\frac{1}{2}$  ton, and 2 cwt. fertilizers used. Crop affected with leaf-spot, which has retarded its growth. This is a disease from which lucerne often suffers, but with proper treatment it generally recovers. Should therefore do well in this soil, which is quite suitable to its requirements.

*Experimenter: Balsillie, J., Kairanga.*—Soil, stiff, alluvial, on compact subsoil. Seed was swamped out by heavy rains after sowing.

*Experimenter: Thorne, A., Levin.*—Soil, a light sandy loam of 6 in. upon a compact sandy subsoil of considerable depth. Ploughed and frequently cultivated at intervals. 10 cwt. limestone, 2 cwt. fertilizer, and 16 lb. seed used per acre. Good stand secured. Plot somewhat troubled with "fathen." Roots, 13 in. Healthy appearance. Soil should prove suitable to lucerne.

*Experimenter: Hunt, H. H., Rongotea (4-plot scheme).*—Soil, 8 in. black sandy soil, on coarse grey sand subsoil. 1 cwt. super.,  $\frac{1}{2}$  cwt. bonemeal,  $\frac{1}{4}$  cwt. sulphate of potash used per acre. Good take has been secured. Very healthy colour. Strong plants. Deeply rooted. Late sown. Plot a mass of docks, but every indication of lucerne doing well here. Even in its weedy state this is a most valuable experiment in this district, as lucerne would be a real boon to farmers on these light sandy flats, of which there are large areas along the coast at the back of the sandhills. Experimenter increasing area next season.



*Experimenter: Wilson Bros., Glen Oroua.*—Soil, rich rather stiff alluvial, upon grey sand subsoil. Broadcasted 16 lb. per acre. Weeds took possession of quite half the plot. Other half has been cut twice since sowing. Weedy; half reploughed and resown. Crop doing well; colour good. Depth of roots about 14 in. Provided land is well cleaned from weeds, and kept so, lucerne would do well in this and similar soils.

*Experimenter: McKenzie, W., Palmerston North.*—Soil, medium to light sandy alluvial, of considerable depth. Ploughed early. Cultivation at intervals. 12 cwt. limestone per acre and light dressing of fertilizers. 25 lb. seed broadcasted. Crop, smothered by weeds. Reploughed December, and resown in January in 7 in. drills. On the 22nd March height averaged 12 in. to 15 in.; deeply rooted; healthy and vigorous plants. Soil should prove very suitable for lucerne. Experimenter is extending area next season.

*Experimenter: Ellis, W. A., Marton (4-plot scheme).*—Soil, a dark, rather compact silty loam 12 in., upon heavy silt 8 ft., upon gravel. Ploughed 10 in. deep. Cultivated at intervals and rolled. 12 lb. per acre on drilled portion, 20 lb. per acre on broadcast portion. 4-plot scheme followed, and 3 cwt. fertilizer used per acre. A good take secured. Plants have made good growth. Appearance very healthy, but land full of weeds. Roots, 15 in.

*Experimenter: Moar, S., Pohangina.*—Soil, coarse sandy soil upon river silt and gravel. Limed and manured. Sown early. Heavy gales swept away both seed and soil.

*Experimenter: Stretton, W., Cheltenham.*—Soil, heavy clay loam on clay subsoil. Ploughed in May and fallowed. Reploughed in September, and cultivated. Land very foul, but lucerne germinated well, although not making much growth on account of weeds. Roots, 8–10 in. Limed at the rate of 1 ton per acre, and light dressing of fertilizers given.

*Experimenter: Booth, H., Feilding.*—Soil, medium alluvial, on river silt. Ploughed early October, 1908. Well cultivated. 15 lb. seed sown in 7 in. drills in November with 1 cwt. super., 1 cwt. bonedust,  $\frac{1}{2}$  cwt. potash-sulphate per acre. Cut four times following season. Has up to 12th March been cut three times this season. Roots over 2 ft. Colour excellent. This crop was limed in 1910.

*Experimenter: Knight, James, Feilding.*—Soil, medium strong loam on porous subsoil, somewhat similar to above. Ploughed August, and 8 cwt. lime applied per acre, and about 2 cwt. fertilizer. Peruvian, Turkestan, Arabian, and Provence varieties sown. All doing well. Turkestan somewhat slower in growth. Roots 24 in. Colour excellent. A first-class crop.

*Experimenter: Hull, G. B., Takapau.*—Owing to dry weather, the sowing of this plot has been delayed.

*Experimenter: Anderson, A., Pariaka.*—Soil, a dark fern loam, intermixed with pumice, upon a fine-grained loam. Ploughed out of fern, cultivated at intervals, and limed. Seed sown September, 20 lb. per acre broadcast, with fertilizers. Crop has done well. Experimenter intends extending area next season.

*Experimenter: Johnston, D., Dannevirke.*—Soil, loam, upon a stiff subsoil. Ploughed in August. Cross-ploughed September. Limed at the rate of 1 ton per acre. Cultivated at intervals. 14 lb. seed per acre; drilled November with fertilizers. Colour fair. Condition fairly satisfactory.

*Experimenter: Pilcher, W. E., Dannevirke.*—Soil, loam, upon a stiffer subsoil. Ploughed and cross-ploughed. Cultivated at intervals. Limed 6 cwt. per acre. 14 lb. seed per acre broadcasted 2nd November. Cut 24th January. Yield about 2 tons green fodder. Colour good.

*Experimenter: Walker, S., Dannevirke.*—Soil, loam, upon sandy subsoil. Ploughed and cultivated at intervals and limed. 14 lb. seed per acre. Drilled 12 in. Rich green colour. Free from weeds. Roots, 2 ft.

*Experimenter: Rich, John, Havelock North.*—To be autumn sown. Land to be ploughed, limed, and subsoiled.

*Experimenter: Badland, B., Hastings.*—Sowing deferred on account of dry weather.

*Experimenter: Wilson, R., Jun., Hastings.*—Sowing deferred on account of dry weather.

*Experimenter: Voullaire, H., Riverlea.*—Soil, 6–8 in., medium loam, upon a medium subsoil. Limed and fertilized. Roots about 12 in. Very weedy. Colour fair in patches.

*Experimenter: Clark, C., Riverlea.*—Owing to land selected being too foul another lot was chosen and is being prepared for next season.

*Experimenter: Valentine, H. J., Riverlea.*—Weeds obtained the upper hand.

*Experimenter: Were, J., Normanby.*—Soil, medium to light loam, upon porous subsoil of considerable depth. Limed at the rate of 1 ton per acre [Toko limesand] applied early in winter. Ploughed and reploughed. Cultivated repeatedly at intervals up till 10th October, 1911, when seed was sown with 2 cwt. slag,  $\frac{1}{2}$  cwt. bonedust, 1 cwt. kainit per acre. Work excellently done. Perfectly free from weeds. Deeply rooted. Excellent colour. Cut in January, and again in February. Well established.

*Experimenter: Willis, D. J., Ararata.*—Soil, light loam. Exposed situation. Wind swept most of the seeds away, and weeds more or less took possession. No criterion as to suitability of this soil for lucerne.

*Experimenter: Barleyman, J. B., Waitara.*—Soil, light sandy loam on light yellow free subsoil. Lime at the rate of 1 ton per acre, 20 lb. seed broadcasted with fertilizers. Crop shows good colour; foul with weeds, and therefore very weak. Roots 10 in. Lucerne will not do when broadcasted with a collection of weed-seeds.

*Experimenter: Buxton, H., Auroa, Hawera (4-plot scheme).*—Soil, light loam, 12–15 in. on light volcanic subsoil. Limed and ploughed in August and fertilized, 14 lb. of seed per acre being drilled in 7th November, 1911. Doing well. Free from weeds.

*Experimenter: Blackbourne Bros., Tarata, Inglewood (4-plot scheme).*—Soil, 8–12 in., sandy loam, upon volcanic subsoil. Limed and fertilized. Ploughed August, and reploughed October, 8 in. deep. 14 lb. seed drilled per acre. Cut in February and again in March. A good crop.

*Experimenter: Schulze, H., Alton (4-plot scheme).*—Soil, light loam, 6–8 in., on porous subsoil. Limed and fertilized. Twice cut. Good colour. Doing well. A healthy crop.

*Experimenter: Dunlop, F., Mere Mere, Hawera (4-plot scheme).*—Wind swept soil and seed away. Has been resown.

*Experimenter: Tarrant, L., Kendall, Taranaki.*—Autumn sowing.

*Experimenter: Amos, C., Alton.*—A good take. Rather weedy.

*Butler, J., Opatiki.*—Soil, river deposit. Ploughed 10th July, 1911, cultivated and sown 16th November. Broadcast at rate of 15 lb. per acre. Cut twice last season.

*Experimenter: Ellis Bros., Bulls.*—Soil, medium loam. Established for three years. Doing well.

*Experimenter: Marshall, G. L., Marton.*—Soil, alluvial, upon gravel. Ploughed and well cultivated. 15 lb. drilled in 7 in. drills, 16th November, 1909, with 2 cwt. super., 1 cwt. sulphate ammonia per acre. Cut in January. Affected by leaf-spot. Cut and disced, then dressed with 5 cwt. limestone, 2 cwt. super., 1 cwt. sulphate of potash. This season has been cut three times, and is doing well.

## TREATMENT OF REFRACTORY SOILS.

### EXPERIMENTS ON LANDS NEAR ONEKAKA, THE PROPERTY OF MR. F. GIBBS, OF NELSON.

G. DE S. BAYLIS.

THERE is a strip of country along the coast near Onekaka and Collingwood which in many respects resembles the pakihi country near Westport. It may be divided into two classes—(1) The terrace land, which produces the same description of fern as is found upon the pakihi and the gum lands, stunted manuka, and a small variety of rush; (2) the swamp land produces for the most part rushes only, with here and there a stunted manuka-bush. On first acquaintance the appearance of the country does not inspire much hope of any fertility being found therein. On the other hand, the configuration of the country is inviting, consisting as it does of tableland spurs of considerable area, separated by small valleys of no very great depth or steepness, in which is found the swamp country before mentioned.

Generally much of this land possesses a greater depth of soil than does the bulk of the Westport pakihi country. Also, fairly considerable areas would appear to be naturally drier; and in this respect a point worth noticing is that the rainfall is less con-

siderable. There is more manuka growing on these lands than is at present the case on the Westport pakihi. In a report on "The Fields Experiments on the Pakihi Lands at Westport," dated 11th May, 1910, I suggested the inclusion in the manure-mixture of rock-phosphate guano, such as Christmas Island (if used in conjunction with other more-readily available phosphate manures), as a cheap means of supplying phosphates, which become gradually available, to a soil markedly deficient in them, and plot A1 in Mr. F. Gibbs's preliminary experiment at Onekaka, which is the best plot there, would appear to bear out this assertion.

#### FIRST EXPERIMENT.

*Plot A1.*—1 ton lime per acre; cost, 14s. Mixture 4: 1 cwt. slag,  $2\frac{1}{2}$  cwt. Christmas Island guano,  $2\frac{1}{2}$  cwt. bonemeal,  $\frac{1}{2}$  cwt. blood, 14 lb. sulphate of potash; cost, £1 18s. 2d.

*Plot A2.*—1 ton lime per acre; cost, 14s. Mixture 5:  $2\frac{1}{2}$  cwt. Japanese super., 1 cwt. bonemeal,  $\frac{1}{2}$  cwt. sulphate of potash, 50 lb. fine-ground limestone; cost, £1 6s.

*Plot B.*— $1\frac{1}{2}$  tons lime per acre; cost, £1 1s. Mixture 3: 4 cwt. slag; cost, 18s.

*Plot C.*— $\frac{1}{2}$  ton lime per acre; cost, 7s. Mixture 2: 4 cwt. slag,  $\frac{1}{2}$  cwt. sulphate of potash; cost, £1 5s.

*Plot D.*—No lime or manure.

*Plant E.*— $\frac{1}{2}$  ton lime per acre; cost, 7s. Mixture 1: 2 cwt. slag, 1 cwt. bonemeal,  $\frac{1}{2}$  cwt. blood,  $\frac{1}{2}$  cwt. sulphate of potash; cost, £1 6s. 6d.

Land ploughed out of native scrub in August, 1910, and lime applied, the area of each plot being 1 acre. Contrary to directions, practically no cultivation was given. The manures were broadcasted together with a seed-mixture of rye-corn, peas, tares, and oats. An attempt was made to cover the seed with the harrow, which I understand was not successful. The consequence was that much of the seed was taken by birds, and little success was hoped for from the experiment, considering that the land had practically been sown on the furrow without either discing or harrowing. The resulting crop was patchy, as might be anticipated, but on plot B the oats attained a height of 2 ft. 8 in.; on plot A2, 2 ft. 10 in.; plot E, 2 ft. 11 in.; plot C, 2 ft. 9 in.; and on plot A1, 3 ft. 8 in.

Mr. Gibbs visited the plots on the 11th March, 1911, and noted that A1 was the best crop of the lot, A2 was nearly as good, E was distinctly inferior to A1 and A2, while B and C were inferior to E.

Plot D was ploughed and sown down in exactly the same way as the other plots, but received neither lime nor fertilizer, and was found to be as bare of plant-life as it was immediately after ploughing. This is a peculiarity of this type of country, which is very similar to the pakihi lands round Westport, where ploughed lands when sown will remain perfectly bare of plants, if neither lime, fertilizer, or previous fallow, together with cultivation, have been given before sowing.

Owing to the lack of proper preparation of the soil, the information gathered from this experiment is not so full as it otherwise would have been. The following points are, however, worthy of note:—

(1.) That these reputed barren lands are capable of being made productive with suitable treatment.

(2.) That in this preliminary experiment the plots to which, more or less, a complete manure had been applied yielded best results. This was probably largely due to the fact that the lime was only applied shortly before sowing, and the land was not fallowed before the oats were sown.

(3.) That with oats, &c., in this soil an increase or decrease in potash did not appear to affect results appreciably.

(4.) That half a ton of lime would appear to be quite a sufficient dressing to start with, but as lime has a cumulative effect upon a soil, and will operate thereon for many years, a larger dressing would most likely more than compensate for its cost.

#### SECOND EXPERIMENT.

The original idea was to have ploughed this land, and to have sown it down to grass in the autumn, but the necessary labour not being then forthcoming it was not until nearly the end of August that the land was ploughed. Lime at the rate of 7 cwt. per acre was then applied. Early in October 25 lb. per acre of a very varied mixture of grasses and clover seeds were sown broadcast, together with 60 lb. slag, 146 lb. Christmas Island guano, 152 lb. bonemeal, 32 lb. blood, and 10 lb. potash-sulphate, composing a mixture of 400 lb. per acre, at an approximate cost of about £1 2s. per acre. A good

sward was obtained, in which the following grasses, among others, were prominent: *Agrostis stolonifera*, *Agrostis vulgaris*, cocksfoot, timothy, tall oat, Chewing's fescue, danthonia, foxtail, some perennial rye, also some *Paspalum dilatatum*. Clovers had done well and looked healthy, and white clover, alsyke, cow-grass, as well as the Lotus family were all in evidence.

#### UNMANURED PLOT.

With regard to the unmanured plot, it was still bare of vegetation, although sown and treated exactly the same as the other plots, except that it had neither lime nor fertilizers applied to it. Here and there, however, some plants of the *Agrostis* species were beginning to put in an appearance, proving that tillage had broken the refractory type of the soil, and that it was making for better things, and towards the production of a type of plant which hitherto had refused to grow upon it.

#### COMPARISON OF WESTPORT AND ONEKAKA SOILS.

While glancing at the analysis made by Mr. B. C. Aston, Agricultural Chemist to the Department, I have extracted the chief points of difference between the soil on the plot at Westport and that at Onekaka, which are as under:—

##### Mechanical Analysis.

					Hydrochloric-acid Extract. Westport. Per Cent.	Onekaka. Per Cent.
Coarse sand	..	..	..	..	8.00	11.0
Fine sand	..	..	..	..	42.60	47.2
Silt	..	..	..	..	21.31	14.1
Fine silt	..	..	..	..	8.94	2.3
Clay	..	..	..	..	14.22	13.3

This sample of Onekaka soil should therefore be of a rather more open nature and be easier to deal with, seeing it has a slightly higher percentage of coarse sand, is possessed of more fine sand, and has less silt, and less fine silt.

Chemically the soils compare as follows, again quoting from the analyses made by Mr. B. C. Aston:—

					Westport. K <sub>128</sub> .	Onekaka. L <sub>596</sub> .
Lime	..	..	..	..	0.012	0.18
Magnesia	..	..	..	..	0.053	0.12
Potash	..	..	..	..	0.064	0.08
Phos. acid.	..	..	..	..	0.002	Trace
Total nitrogen	..	..	..	..	0.239	0.130
Available potash (K <sub>2</sub> O)	..	..	..	..	0.0074	0.014
Available phos. acid (P <sub>2</sub> O <sub>5</sub> )	..	..	..	..	Small trace	Trace.

We thus see that again the Onekaka soil is the better of the two, possessing more lime than the one at Westport, which possesses more magnesia than it does lime. At Onekaka there is more potash. Phosphoric acid, however, is markedly deficient, and this want is still more in evidence at Onekaka than at Westport. In nitrogen, however, Westport has the advantage.

The outcome of this, from a practical view-point, appears to be that a smaller application of lime is likely to be necessary in treating this class of Onekaka soil than would be advisable on a soil at Westport similar to K<sub>128</sub>; that there is more potash locked up at Onekaka, which the lime would assist to liberate, than there is at Westport, and that a larger percentage of the potash at Onekaka is already available than is the case at Westport; that on both soils fairly heavy applications of phosphates will be necessary; that, according to standards set down by authorities upon this subject in other parts of the world, nitrogen in this soil is the only requisite that may be said to exist in fairly satisfactory quantities, although, as before stated, little of it is probably available at present for the plant's use. Lime and cultivation, and drainage where necessary, will assist in course of time to make it so.

Great care must therefore be taken in the manuring of this country to keep up the necessary balance of ingredients necessary to plant-life, as, with so small a supply to draw upon, the success of the growing crops will largely depend upon the suitability of the mixture used to the requirements of the crop, and the available content of such ingredients in the soil at the time being.

The configuration of the country lends itself easily to drainage and cultivation. Cliffs of lime exist. Lime and cement works are already established. The water frontage should afford cheap freights for manures, and other requisites. A creamery is already established not very far away. The possibilities of this pakihi land have already been demonstrated, and the rightly directed energy of the settlers is the one thing now needed to convert these barren lands into good pastures and productive farm lands.

Further experiments will doubtless prove, as is the case with the gum lands in the north and the pakihi on the West Coast, that, by draining, ploughing, fallowing, liming, and cultivation, good results can be obtained with far less fertilizer than is necessary when the land is ploughed up and sown immediately, thereby leaving the soil still acid and rendering little of the latent food within the soil available for the plant's use, thus making the crop so sown mainly dependent upon the artificial fertilizers applied.

## PEAS AND CABBAGE TRIALS.

G. DE S. BAYLIS.

EXPERIMENTER: W. Arundell, Patea. Description of soil: 6 in. to 8 in. loam upon a light, yellow, porous subsoil.

*Drumhead Cabbage*.—Ploughed 8 in., July 15; harrowed and scuffed several times till Nov. 6; cultivated, Nov. 27; earthed up, Dec. 16. Sown in seed-bed, Oct. 6. Planted out, Nov. 6. Manures per acre: 89 lb. super., 10 lb. bonemeal, 9 lb. nitrate of soda, 18 lb. gypsum. Ready for feeding, Mar. 10. Yield, 57 tons. Average weight of cabbage, 16 lb. A regular well-grown crop.

*Cow-peas*.—Sowed twice; on each occasion cut down by wind.

*Stratagem Peas*.—Ploughed 7 in. to 8 in., July 15; harrowed, Aug. 8; scuffed, Aug. 9; harrowed and scuffed, Sept. 8; harrowed and earthed up Oct. 3. Date sown, Oct. 3. Seed per acre, 2½ bushels. Manure per acre: 256 lb. basic super., boneflour, and sulphate of potash mixture. Harvested, Feb. 16. Yield, 36 bushels.

## CO-OPERATIVE EXPERIMENTS.

THE Department co-operates with farmers who desire to carry out crop experiments—both variety and manurial—on their farms.

The Department will supply the seed and manure, and will design and supervise the experiments; while the farmer provides the land and labour, and retains the crop.

The area of each plot is usually limited to from one-tenth to one-fifth of an acre.

Further information can be obtained from—

THE DIRECTOR OF FIELDS AND EXPERIMENTAL FARMS,

DEPT. OF AGRICULTURE, COMMERCE, AND TOURISTS,  
WELLINGTON.



## PASTURES AND CROPS.

## JUNE.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pasture and crops during the past month:—

**AUCKLAND.**—From the 1st to the 4th of last month the weather was very unfavourable, heavy rain falling, at intervals accompanied by thunder and lightning, which greatly retarded farming operations; some very severe frosts were also experienced. Then followed a few fine, sunny days, which made things in general look more pleasant. Soon, however, the weather changed again, and it continued to rain to the close of the month. Pastures are still making a fair growth; substitutes, such as hay, green oats, maize, turnips, and mangels, are at the farmer's disposal, so that there is no reason to fear that cattle of any description may suffer from scarcity of feed in these parts. All classes of stock are in good condition, particularly dairy cows, which keep up the Auckland milk-supply. The outlook from the farmers' point of view may be said to continue bright.—*R. Rowan.*

**TE AROHA.**—The weather in June has been boisterous, with heavy falls of rain. Several keen frosts during the latter part of the month have retarded the growth of pastures; but in spite of that there is abundant feed. Turnips and rape crops are very good, and with rich supplies of well-harvested hay the settlers in this district are well prepared for the winter, which is likely to be a severe one.—*J. L. Morris.*

**HAMILTON.**—The month of June was exceptionally wet and boisterous, with cold southerly winds, and a light fall of snow on the Pirongia Mountain. There were four frosts during the month. The root crops being good, and a fair quantity of hay available, there is every prospect of a sufficiency of feed to carry stock through the winter.—*J. Kerr.*

**CAMBRIDGE.**—The greater part of the month was very wet, with heavy rains at intervals. The temperature was very mild, only three frosts occurring. The pastures are looking well throughout the district, and farmers have saved a lot of hay; and with good turnip crops there should not be any shortage of feed for stock throughout the district for the winter. Ploughing is a bit backward owing to wet weather.—*A. A. Clapcott.*

**OPOTIKI.**—The weather during the past month was very rough. Cold winds and heavy rain were experienced. Snow was to be seen in some parts on the hills, which is very unusual in these parts. Feed is getting pretty short, and stock, in most instances, have felt the effect of the late severe weather.—*John Case.*

**TE KUITI.**—The weather in June was exceedingly wet and cold; wintry rains were constant, and the winds from the snowy mountains were arctic in their temperature. Floods were experienced everywhere, the rivers having overflowed and inundated the adjoining flat country. Pastures show no growth, and feed is becoming scarce. Turnips are being fed off; white turnips have good tops and bulbs, and swedes good tops with medium-sized bulbs. Mangels are also being fed to stock; these roots are of satisfactory size and consistency.—*B. Bayly.*

**GISBORNE.**—The weather during the first three weeks of June was fairly mild, with a good deal of rain. In the past week there has been very stormy weather, with cold wind from the south, rain, and light falls of snow on the higher inland country. As the snow soon disappeared the stock has not suffered. Where dairying is carried on cattle-feed is rather short; and, as very little winter feed is grown, the cows will suffer to some extent during July and August. Maize-picking is now in full swing, and promises an average yield of 75 bushels per acre. The owner of one crop of nine acres near Makaraka expects a yield of 100 bushels per acre.—*William Ross.*

**WAIROA.**—The weather-conditions of the past month were of the most favourable character, the present being one of the mildest winters ever experienced in the county.

The consequent result is that feed is plentiful throughout the district. All root crops are looking splendid.—*T. F. Mullaly*.

**HASTINGS.**—We have had considerable variety in the weather-conditions last month. An exceptionally heavy covering of snow remains on the ranges, and on the lower lands an average supply of rain has fallen. Severe frost and cold weather were general. Pastures are still fair, but growth is practically nil. So far stock are doing well; but dairy stock and young sheep will suffer if the wet weather should continue.—*J. G. Parker*.

**WAIPIKURAU.**—The weather in June was very changeable. During the greater part of the month showery weather was experienced, with cold winds and several sharp frosts; and on the 23rd occurred a fall of snow, which lay for about twenty-four hours on the low country. The weather since then was very wintry.—*H. O. M. Christie*.

**PAHIATUA.**—The past month was very wet and cold, and farm operations thereby became impossible. The total rainfall amounted to 6.75 in.; rain fell on twenty-four days, the maximum fall of 1.64 in. occurring on the 1st June.—*Thomas Bacon*.

**NORTHERN WAIRARAPA.**—The weather was very severe throughout the past month. There were cold, sleety showers, accompanied by high winds, and heavy falls of snow occurred on the Tararuas and the low-lying hills. The rough weather was much felt by stock, especially where there had been made no provision for winter feed. There is little or no growth at present, consequently the grass is short and soft, and does not contain much nourishing substance.—*J. S. Rankin*.

**MASTERTON.**—June was an exceptionally wet and cold month; there were some very wet days and several exceedingly hard frosts. Snow fell at intervals; it reached very low down on the ranges, and extended in some places to the flat country. Winter feed was much appreciated during the month. Several ensilage-stacks have been successfully built, and will prove of great value for winter feed.—*T. C. Webb*.

**CARTERTON.**—The weather, for the greater part of June, has been most severe, and trying to stock. Cold rain and heavy frosts were experienced. Snow has fallen on the high country, which has caused the rivers to rise.—*S. C. Ivens*.

**WELLINGTON.**—The weather has been inclement. Boisterous gales, frequent cold and heavy rains and hailstorms have been experienced, with several severe frosts, which, on the rain-soaked lands, are having a bad effect on feed. Stock is looking fairly well; little mortality so far. The milk-supply is short, and herds are drawing heavily on supplementary feed.—*G. H. Jenkinson*.

**STRATFORD.**—The weather in June was very changeable. Heavy rain fell during the month; thunder and hail also occurred. There were heavy snowfalls on the 22nd and the 23rd. The consequence of the bad weather is that all outside agricultural work has been considerably retarded.—*A. F. Wilson*.

**HAWERA.**—The month of June opened with high winds and heavy rainstorms from the west. These conditions prevailed with more or less intensity until the 11th, when a few frosts with bright sunny days were experienced. An unpleasant change again set in on the 20th, the weather being distinctly wintry. High winds from the south-east predominated, accompanied by violent rain and hail storms, and almost total absence of sunshine. Similar conditions prevailed till the end of the month. The condition of stock is good, and does not appear to have been seriously affected by the cold, wet weather of the past week or two. Grass is still plentiful, and liberal extra feeding with hay and ensilage is being generally resorted to.—*A. J. Glasson*.

**WANGANUI.**—The weather in June was exceptionally wet and windy. From light showers to heavy storms fell intermittently during the major portion of the month. Four days—from the 8th to the 12th inclusive—was the longest period without rain. The temperature frequently was low, and the wind generally cold and inhospitable. Agricultural work awaits more favourable weather-conditions. Pastures are looking well for the time of the year.—*C. Watson*.

**TAIHAPE.**—The weather during the past month was exceptionally wet and cold. The rainfall was 6.58 in. Rain fell on twenty-four days; the maximum fall was 1.08 in. on the 19th. Snow fell on five days. Pastures are still fair.—*A. P. Smith*.

**OHAKUNE.**—The weather throughout the past month was exceptionally wet and cold. Snow fell on the 15th and 22nd, and the month ended with a heavy fall of snow. The prevailing conditions are unfavourable both to stock and pastures. Rain fell on twenty-four days, the total rainfall for the month being 10.36 in.—*P. Barry*.

**FEILDING.**—The weather was very wet and cold during the past month, and only thirteen fine days could be recorded. Nevertheless feed was plentiful, and there is every

indication of an early spring. Oat crops that are sown and above ground look very promising; but many farmers are backward with their ploughing and seeding operations. Root crops are much better than last season, but fine weather is required for feeding down. The stock throughout the district are looking exceedingly well.—*William Dibble*.

**PALMERSTON NORTH.**—During the month of June the weather was exceptionally cold and wet. The total rainfall for the eighteen wet days was 6.81 in. The heaviest single day's rainfall was on the 1st of the month. Several sharp frosts were experienced, but the pastures are fairly good for the time of the year. Owing to the heavy rainfall there is a good deal of surface-water lying about, which will hinder cultivation.—*W. Dalglish*.

**NELSON.**—The weather during June has been changeable. Showers or heavy rains, with snow on the higher ranges, alternated with fine days accompanied by rather severe frosts at night. The pastures, especially the native ones, are exceedingly good for the time of the year, and most of the stock look well. The principal grain crops sown at present are oats, and they are growing well. Some farmers predict an early spring.—*Gilbert J. Ward*.

**HOKITIKA.**—June was a cold and very wet month. The rainfall to date (29th) has been 14.28 in., the maximum being on the 15th, when 3.62 in. was registered. The ranges have a heavy coating of snow, consequently frosts are very severe, and feed for stock is becoming scarce. Everything points to an exceptionally cold winter. Unfortunately root crops in connection with co-operative experiments have been unsatisfactory this season on the West Coast, owing to continual wet and cold weather, and, in some cases, to the ground being flooded soon after the seed was sown.—*H. J. Walton*.

**BLENHEIM.**—There has been considerable variation in the weather during the month. The first three days were bright and sunny, with hard frosts at night. Then came a period of rain and fairly heavy snow on the high country, followed by bright days and hard frosts at night. Afterwards there was another change to warmer weather, accompanied by heavy rains, which caused considerable floods in rivers, especially in the Pelorus, which was higher than it has been since the 1904 flood; but fortunately there has been no serious loss of stock. The last week was fairly fine, with hard frosts.—*F. H. Brittain*.

**SEDDON.**—The weather during the whole of June was very changeable. From the 1st to the 16th cold, showery weather prevailed, with snow falling in Upper Awatere. There were several sunny days accompanied by severe frosts. From the 18th to 21st very heavy rains fell, and the warmer weather caused the snow on the mountains to melt, with the consequence that all rivers and streams were flooded; then came a heavy fall of snow, especially on the higher country, but reaching right down to the coast. The latter portion of the month was a succession of heavy frosts, with bright, sunny days. Although the growth of the pastures is retarded by the frost, settlers are confident of wintering stock well.—*E. T. Sinclair*.

**ROTHERHAM.**—The weather during the past month was very seasonable. There was a fair amount of frost during the early part of the month, and also a good deal of snow on the high country. On the 30th there occurred another fall of snow, which was a general one, there being about 1 in. on the low country. April was a very wet month, there being 5.17 in. of rain. May was much drier, there only being 2 in. Pastures are still good, having made a good growth in May. Potato-digging is now completed, and yields are somewhat disappointing.—*W. M. Munro*.

**KAIKOURA.**—With the exception of a cold blizzard on the 23rd, a few hard frosts and rough stormy weather on the 29th and 30th, good weather for this time of the year has prevailed. Very little autumn sowing of grain has been done. Pastures are making little or no growth, but there is a fair amount of feed about. A few early lambs are now to be seen.—*William S. Goodall*.

**RANGIORA.**—The weather during last month has been very favourable. Most of the farmers have taken advantage of it and got nearly all their ploughing done. There have been a few hard frosts, and during the last week a good deal of rain and snow has fallen on the high country, and a little on the flat. There is plenty of winter feed up to the present.—*A. Hughes*.

**LINCOLN.**—The first week of June was mild, the rest of the month, generally, wet and cold. The area under winter-wheat is small, heavy lands having been too wet for cultivation or sowing. The state of the ground, together with a scarcity of labour, greatly hindered potato-digging, and many crops are now rotting in the ground. Very few of the growers of clover-seed were able to harvest their crops satisfactorily, many not at all, owing to the absence of suitable weather.—*J. G. Scott*.

ASHBURTON.—June was a wet month ; it rained on sixteen days. The total rainfall amounted to 2.61 in. as compared with 6.105 in. for the corresponding month of last year. There have been some heavy frosts, up to 17 degrees. Rain and frost have retarded ploughing considerably. Turnip crops are lasting well, and some good potato crops have been lifted.—*C. Branigan.*

TIMARU.—The weather has been very broken during the month : snow on the low hills, heavy frosts, and heavy falls of rain. The rain had developed the sowing of winter-wheat and general farm-work.—*J. C. Huddleston.*

FAIRLIE.—June was a very wet and unfavourable month ; there were only a few fine days, with very severe frosts at night. A heavy fall of snow occurred in the north end of the Mackenzie country on the 19th. Some snow-raking has been done, but no loss of stock is expected. Up to the present all the low country is clear, and stock is wintering well. The season for fat stock is now at an end. The returns of Fairlie Railway-station for April, May, and June, compared with those for the same months of last year, show a decrease of 40 per cent. in the number of fat lambs sent to the works. The very poor lambing is blamed for this. The returns of grain trucked in April, May, and June show a large increase over those for the same period of last year. Nearly a third of the crops has not yet been threshed ; this will be done in spring, as the threshing-mills cannot at present be moved about, owing to the very wet condition of the country.—*W. B. Manning.*

OAMARU.—The weather in June was very changeable ; it was wet and cold. The rainfall amounted to 3 in. Farmers are, however, getting on with their winter work.—*S. M. Taylor.*

WAIMATE.—The month of June has been unusually cold ; severe frosts with snow on high country, and occasional heavy rains have been experienced. Threshing operations have been much hindered. Many mills have ceased work, it being in many cases impossible, owing to the wet condition of the land, for a threshing plant to get on the land. Yields recorded of cereals already threshed are very good. Farmers have taken advantage during spells of fine weather, and drilling of grain has been hurried on apace. A scarcity of labourers for farm-work is being felt ; and it is doubtful if the area in cereals will not be considerably less than was anticipated some time ago. With pastures so good, and the fair crops of turnips and mangels noticeable, there is ample evidence of sufficient fodder to carry stock through the remainder of winter. Potatoes generally are turning out well up to expectations, and some good yields are noticeable.—*F. A. Macdonald.*

KUROW.—The weather during June was beautifully mild, with several beneficial showers and very little snow on the high country. There was almost an absence of frost from the 1st to the 23rd, which allowed farmers to get well on with their ploughing, sowing, &c. There is a plentiful supply of feed on the rough country, and runholders have suffered no loss in their flocks, so far, from snow.—*G. Reid.*

DUNEDIN.—During the month of June the weather was very cold and wet, with a fair amount of snow on the hills. The ground is now thoroughly saturated, and work on the land is at a standstill.—*J. R. Renton.*

SUTTON.—The weather throughout June has been very stormy, with an excessive rainfall, also occasional hard frosts. Stock, however, is in good condition, and should come through the winter well. Most farmers are well provided with extra winter feed in both straw and turnips.—*W. Scott.*

PALMERSTON SOUTH.—Throughout the month we have had good seasonable winter weather—heavy rains and frosts with snow on higher levels, also one or two slight frosts on lower country. The land has now had a good soaking, although not too much. Lea land is in good condition for ploughing. Early-sown crops are showing a good braid. No threshing has yet been done in Macrae's, Moonlight, or Green Valley districts. Pastures are rough and good, and all stock are in good condition.—*C. S. Dalgleish.*

MOSGIEL.—During the month of June rain fell on nineteen days. On the 4th snow was lower down on the surrounding hills than has been the case for the last three years. Very heavy rain fell on the 12th and 13th, causing the Silverstream and Tokomariro Rivers to overflow their banks, and the low-lying land was under water for some time ; but the flood did not cause any damage, and the land is practically dry again.—*H. McLeod.*

CLYDE.—The rainfall for last month was 1.38 in., being the wettest June experienced for many years. There were some severe frosts, but on the whole the month was a mild one. Snow fell on the 29th, but the fall was only a slight one on the low country. The frost now appears to have set in. The pastures are wonderfully fresh for the middle of

winter. There has been considerable sowing of both wheat and oats. Turnips are lasting very well, having made good growth in the late autumn.—*Thomas N. Baxter.*

NASEBY.—June was a changeable month. Rain and snow prevailed up to the 16th. Since then the weather has been more favourable, although cold snaps and heavy frost have set in. Snow is lying on high country. Grass everywhere in Maniototo is looking well, and stock is keeping in good condition.—*A. T. N. Simpson.*

BALCLUTHA.—The weather in June was very rough. Rain fell on seventeen days; the heaviest fall was on the 12th, when 70 points were registered. The total fall for the month was 3.93 in. All farm-work is at a standstill; some mill-owners have ceased operations owing to the wet state of the ground. In some cases oats and wheat are still in stook; there is one farmer who has got 200 acres of a very heavy crop out. Feeding-off with turnips is very difficult owing to the continued wet. Potato crops are very poor, but fairly free of disease. So far there has been very little frost.—*Hugh A. Munro.*

TAPANUI.—The weather was extremely rough and wintry during the whole past month. Farm-work is practically at a standstill. In a few isolated instances crop is still standing in stook, and must now be almost worthless, except it be carted out to stook. Turnips, on the whole, are fair, but evidently potatoes are not yielding very well, and, owing to the very wet condition of the ground, in many instances, difficulty is being experienced in lifting them. Should this weather continue the work of preparing ground for the coming season's crops will be much behind. During the month we have had three falls of snow on the low ground. Rain fell on twenty-four days, and the total rainfall was 7.98 in.—*W. J. McCulloch.*

LAWRENCE.—The weather in June was very cold, with light falls of snow and sharp frosts. Rain fell on twenty-one days, and the total rainfall was 4.87 in. Farming operations are hindered very much by the broken weather. Threshing is progressing slowly. There are a few isolated cases of crops still being out in stook, and there is no likelihood of saving them yet. There should be every chance of a good spring after all this rough and wet weather; it has been broken weather practically since October last. There will be very little autumn or winter crop sown, on account of the lateness of the harvest this year.—*R. Barron.*

INVERCARGILL.—Very little frost was experienced during June, but it was a cold, wet month, and the rainfall has been high. Pastures are bare, and turnips are being fed off. The wet state of the ground has greatly retarded the work of lifting potatoes, and there is still a large area to be dug. The smaller rivers in this district have been running bank high for nearly a month, and on occasions they have overflowed their banks. The larger rivers, however, have not been carrying so much water as inland ones. A considerable amount of snow has fallen. The rainfall for the month was 6.59 in., falling on twenty-five days.—*J. R. Whyborn.*

OTAUTAU.—The present month was the wettest for many years: there have been practically only four fine days up to the present. A change for the better, however, appears to have come, which will be welcome to the farmers. All farm-work has been practically at a standstill owing to the wet nature of the ground.—*H. F. Dencker.*

GORE.—The past month was one of the worst experienced in this district; it rained day after day. There was also a good deal of snow. In consequence, farm-work has been practically at a standstill, and up to the present very little ploughing has been done. I do not know of any winter wheat having been sown; as the ground is full of water now, it looks as if harvest will be late again next year.—*B. Grant.*

QUEENSTOWN.—During the whole past month very unsettled weather was experienced; there was frost for a few nights, then came rain with snow on the higher levels. There was no snow on the lower country until the 29th, when it was about an inch high; snow equal to several inches had fallen previously, but it melted away, as there was no frost in the ground. All the high country is now carrying a heavy cover of snow. The winter so far has been milder than last year.—*A. Clarke.*

OWAKA.—The weather in June was exceedingly wet and rough. There was much rain, while there was a good deal of snow on the high country; in some cases it was fairly low down. A good many farmers have their crops still in the stook. There will be a considerable amount of inferior chaff this year. Owing to so much rain roads in portions of the district are next to impassable.—*Thomas D. Urquhart.*

LUMSDEN.—During the month of June we experienced a very heavy rainfall, also several days of snow on the low country, and much snow on the high country. We had only five days without rain during the month. Consequently all farm-work is very much behind, and stooks are still to be seen in some paddocks with very little hope of



being harvested. Oats already threshed are showing a good return; but the grass-seed a very light one. Potatoes are not yielding as well as expected. At the time of writing snow is falling, with the appearance of more rough weather to follow.—*W. S. S. Cantrell.*

PEMBROKE.—The weather during the past month was wet and cold; so much rain has not been experienced in the winter for years. A considerable amount of snow has fallen on the higher country. The frosts have also been exceptionally severe. Towards the latter part of the month outside work of all kinds has been practically suspended.—*J. A. Griffith.*

## THE FRUIT CROP.

OFFICERS of the Orchards, Gardens, and Apiaries Division report as follows regarding orchard conditions for the month of June:—

WHANGAREI.—The fruit now being all off, orchardists are giving their attention to pruning, and some are well advanced with their peaches.—*J. W. Collard.*

AUCKLAND NORTH.—June was a cold, wet month, with very few fine days. Apples are still fairly plentiful, and dessert varieties are selling well. Pears are nearly finished. There is a noticeable improvement in packing of apples now coming forward.—*W. C. Thompson.*

AUCKLAND SOUTH.—Throughout this month it has been wet and boisterous. Apples and pears in my district are all finished, and prices have increased a good deal since last report. Growers are getting ready for winter spraying, of which there will be a good deal done, as they are beginning to realize the benefits derived from same.—*N. R. Pierce.*

HAMILTON.—Wet and stormy weather with a few fine days at intervals has been the order for the month. Growers are preparing for their winter spraying, and in most districts pruning is well in hand.—*T. E. Rodda.*

POVERTY BAY.—June was generally a wet, windy, and cold month, with a few frosts and a few fine days thrown in. The market principally consists of apples, pears, and lemons beside the usual imported lines. Pruning of peaches and plums has commenced.—*W. R. L. Williams.*

WANGANUI.—Pruning is now in progress in the orchards throughout the district. In many cases peaches are badly affected with leaf-curl and die-back also. Apples affected with woolly aphid have received extra treatment by an autumn application of spray. Apple and pear wood are well set with flower-buds. Peach wood is generally soft and immature.—*W. C. Hyde.*

MANAWATU AND WAIRARAPA.—Fruit stored by growers is fetching a good price. Absence of bitter pit is noticeable. Growers have started pruning in earnest. Red oil is being almost wholly used for winter spraying. The ground is being got into good condition for early spring planting.—*George Stratford.*

HASTINGS.—Winter work in orchards is progressing satisfactorily. Pruning and spraying are well on. Many new orchards are being planted.—*J. A. Campbell.*

NELSON.—Heavy rains have fallen during the month, and low-lying orchards are very wet in consequence. Apples are still fairly plentiful, pears almost finished. In addition to large plantings of fruit, present indications are for extensive planting of hops in parts of the district.—*J. H. Thorp.*

CHRISTCHURCH.—Apples are still plentiful, prices moderate. Pears are slackening off. Pruning is in full swing; planting retarded owing to soil being too moist.—*W. J. Courtier.*

DUNEDIN.—Nothing special doing. Large number of trees are coming to hand for planting. Growers are busy with pruning and winter ploughing.—*W. T. Goodwin.*

A few weeks ago a consignment of 11 tons of good-quality honey was exported to England by the South Taranaki Beekeepers' Association. It is of interest to those engaged in the industry and to the general public to note that even in a poor season honey can be sent out of the country.

## WEATHER FOR JUNE.

D. C. BATES.

## DISTRICT NOTES.

District.

*Chiefly from Telegraphic Reports.*

1. Rainfall slightly above the average for the month, the number of wet days being greatly in excess. Generally a boisterous month with westerly and south-westerly winds predominating, and consequently a lower average temperature than usual.
2. The excess of rainfall above the average in this district ranged from 10 in the north to as much as 50 per cent. in the southern portion, and more heavy rain fell during the month than in district No. 1. Some stations reported a thunderstorm on the 1st and 2nd, accompanied by very heavy rain. Over  $2\frac{1}{2}$  in. were recorded at several stations on the 19th, most of the rain falling through the night. Weather similar to that in district No. 1.
3. The rainfall was slightly below the average. Short periods of fair weather alternated with squally and showery conditions. Some frosts occurred inland, particularly severe ones on the 11th and 25th. Snow fell on the ranges on the 24th.
4. A very cold, squally, and wet month, the rainfall being generally in excess of the average, except at a few coastal stations. Heavy rain fell on several days, particularly the 12th, 15th, 19th, and 27th; but precipitation was generally in the nature of heavy showers, which fell on as many as twenty days at some stations. Strong winds were a feature of the month, gales being frequent.
5. In this district those stations abutting the Bay of Plenty received slightly less than the average rainfall, but inland the total fall exceeded the average for the month by from 15 to 40 per cent. The prevailing wind was south-west, and the weather cold and showery. Numerous frosts occurred inland, the most severe on the 11th, 12th, 22nd, 26th, and 27th.
6. The rainfall exceeded the average by from 40 to 60 per cent., and there were very few days on which precipitation was not recorded either in the shape of rain or snow. The latter fell on several occasions, and the fall on the 22nd and 23rd was judged to be the heaviest for years.
- 7, 8. The distribution of rainfall in these two districts was very variable, some portions recording slightly less than the average fall for the month, but generally the total was somewhat in excess, averaging about 15 per cent. The month was a cold and showery one, and some heavy snowfalls occurred at some of the high inland stations, especially on the 23rd, 24th, and 29th. Frosts were frequent and at times severe. On the night of the 23rd an exceptionally strong southerly gale was experienced, and a thunderstorm in parts.
9. The rainfall was 40 per cent. above the average. June was a very windy and cold month, having very few days without rain. Much snow fell inland on the 23rd, and slight falls were also recorded on the 29th and 30th.
10. The south-east portion of this district received slightly under the average rainfall, although showery days were numerous. Elsewhere the total fall exceeded the average, in some cases by 100 per cent., but usually from 20 to 50 per cent. The weather was exceptionally windy and cold.



- 11, 12, The whole of the west coast of the South Island experienced an exceptionally wet and stormy month, the rainfall at many stations being double the average for June. The heaviest falls occurred between the 15th and 20th, during which period many of the rivers were in high flood. Thunderstorms accompanied by hail-showers took place on several occasions, and snow fell frequently on the high country.
- 13.
14. A cold and showery month, but heavy rain fell on the 15th and 18th, the total being above the average, at some stations as much as 60 per cent. Numerous frosts were reported.
15. Precipitation was about 40 per cent. above the average of June, a great proportion falling as snow. Cloudy and showery weather predominated, and there were very wet conditions about the middle of the month.
16. The rainfall was 20 per cent. above the average, mostly falling between the 13th and 19th of the month. Snow fell on the 19th. Moderately fair weather prevailed between the 2nd and 7th, and again between the 20th and 26th, when some hard frosts occurred.
17. June was generally a dull and cold month, with precipitation in excess of the average by from 30 to 40 per cent. Snow fell on the hills, and hard frosts were recorded on numerous days. Fogs also were frequent about the middle of the month. A fine spell lasted from the 22nd to the 26th.
18. In the northern half of this district the rainfall was very much above the average; in parts of the Sounds it was more than double the average. Further south, however, and on the east coast between Cape Campbell and Kaikoura, the total in some cases did not reach the average. The period between the 12th and 20th was the wettest, and on the 15th and 19th several stations reported a fall of over 2 in. Fair weather was experienced generally between the 21st and 26th, and in parts between the 3rd and 8th. The remaining portions of the month were showery and at times squally.
19. From 15 to 40 per cent. less than the average rain fell, no particularly heavy fall occurring, but showers were frequent. The weather was cold, and some very hard frosts were experienced. Snow fell on the higher country on the 9th, 22nd, and 29th.
- 20, 21, The rainfall was about the average for June, at some stations slightly less. Dull weather predominated. Slight falls of snow occurred on the 22nd and 29th. Frosts were recorded on as many as twenty days at some stations.
- 22.
23. The total rainfall was generally slightly in excess of the mean for the month of June. Weather similar to 20, 21, 22.
- 24, 25. A wet and squally month, the rainfall and the number of rainy days exceeding the average, the former at many stations by over 100 per cent. Snow and sleet fell on several days.

#### BRIEF SUMMARY.

June proved a month of unsettled and wintry weather. Heavy rain fell in most parts of the North Island and on the west coast of the South Island. There were several thunderstorms, with hail in many parts of the Dominion, and snow fell at times on higher levels and in some other districts which rarely experience snowfalls. Three extensive westerly low-pressure areas prevailed—between the 1st and 10th, the 15th and 23rd, and from the 27th to the 30th—and a cyclone apparently passed eastward of East Cape, causing a southerly gale southward of the cape on the 24th and 25th. The lowest barometric pressure recorded during the month was 29.05 in. at Wellington on the 1st, and the highest 30.48 in. at the Bluff on the 10th.

The *Field* reports that milk-testing has resulted in the south-western counties of Scotland in an average production of 700 gallons per annum, whereas formerly farmers were satisfied with 500 gallons.

## APPLE EXPORT.

## THE NELSON SHIPMENT.

T. W. KIRK.

THIS shipment, consisting of 5,504 cases, of which 5,411 cases were sent under the Government guarantee of 1d. per pound net return to growers, reached London per s.s. "Kaipara" on the 24th April last. The range of temperature maintained in the apple-chamber during the voyage was between 36° and 40°.\*

On examination the apples were found to be in good condition. Some of the fruit was rather small and immature, and a few of the softer varieties, such as Cox's Orange Pippin, were overripe.

The consignment was offered for sale at the City Sale-rooms. There was a large attendance of buyers, competition was good, and the prices realized were from 5s. 6d. to 11s. per case, averaging about 7s. Owing, however, to the coal strike being at its height at the opening of the Australian apple season, trade was greatly upset, and the earlier arrivals were not readily sold. This resulted in stocks accumulating to some extent, and, as shipments then coming forward were large, the position was bad. The market had not recovered by the time the New Zealand shipment arrived, hence the comparatively low prices realized. It has, however, been proved that New Zealand apples can be landed in London in good condition.

With a little more care by the growers in grading and packing there is no doubt good prices can be obtained in the London market for good quality New Zealand apples.

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\* The temperature at which the fruit should be carried recommended by the Department was 35° to 38° Fahr.

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Owing to foul-brood, the number of hives in the United States showed a decrease at the last census of over a million hives.

The milk-records of a Swedish testing association, covering a period of ten years, show that in the first year the average milk-yield was 6,890 lb. per cow, and the butter-yield 236 lb. In the tenth year the average milk yield was 10,064 lb., and the butter-yield 345 lb. There were 639 cows in the tenth year.



## COMMERCIAL REPORTS.

## VANCOUVER MARKET.

THE New Zealand Trade Representative at Vancouver reports as follows on the position of New Zealand produce on the Vancouver market:—

## NEW ZEALAND BUTTER.

Vancouver, 20th May, 1912.

There is at the present time a great deal of New Zealand butter being retailed on this market, apparently genuine "unfaked" New Zealand butter, which is distinctly off in flavour, and, so far as we are able to trace this, it comes largely from shipments received from San Francisco. This butter *via* San Francisco is, as you know, liable to be out of cold storage from six to seven days from the time it is discharged from the Union Steamship Company's steamer at San Francisco until it is delivered at the wharf here. Distributors here, many of them not accustomed to refrigerated fresh butter, probably treat the F'risco shipments in exactly the same way as shipments coming by direct steamers, taking it into their unrefrigerated warehouses for several days before bricking it up and sending it out to the retailers. The retailers again may have it in their stores several days before it goes into consumers' hands, and, therefore, before the consumer actually gets to using the butter it may have been out of cold storage for two or three weeks or more. Another point is that this butter, on its way up from San Francisco, is quite likely, we think, to be stowed in holds with other cargo, which may affect the flavour of the butter. Shippers from New Zealand should realize that the routing of butter to this market *via* San Francisco is at the best a makeshift, and use all their influence to have practically the whole of the refrigerated space on the direct steamers rendered available for butter from that country, if needed. It is far better for Wellington butter to be exposed to the trip up the coast from Wellington to Auckland and then come here direct, than it is to have it shipped to San Francisco and then be subject to delay there and to the journey up this coast to Vancouver in unrefrigerated steamers.

Vancouver, 13th June, 1912.

Complaints having been made to me that butter other than New Zealand was being sold on this market in New Zealand wrappers, I immediately instituted inquiries. I interviewed several of the most reliable and honest butter-merchants and requested them to support and aid me by giving their commercial travellers instructions to report to them on wholesale firms or retailers that were selling butter other than New Zealand on this market in New Zealand wrappers. By this means I was fortunate in securing names of firms. I immediately went to the defaulters and had a conversation with them, in which I gave them due warning that in the future, if they persisted in this nefarious practice, I would, of necessity, be forced to take proceedings in Court to expose them and also to protect the good name and quality of New Zealand butter, which has been established on this market. I must say that I found the merchants very agreeable, and they expressed themselves willing to immediately withdraw the butter; their excuse being that, there being so great a demand for New Zealand butter, they did not consider that they were doing any harm, seeing they had been disappointed by their orders being short-shipped at the port in New Zealand. They then substituted the best Californian, which they personally thought was equal in value and quality.

I am fully convinced the New Zealand butter is worth cents a pound more than the Californian; the latter contains too much moisture, salt, and colouring. The public who have used New Zealand butter this season will not be gulled by such a watery substitute.

## ONIONS.

Vancouver, 20th May, 1912.

The "Zealandia" arrived with over 8,000 crates of New Zealand and Australian onions. These were very welcome, as local stocks were entirely cleared. The Australian onions were very fine hard stock, what is known here as Australian brown variety. The New Zealand onions were not in such good condition. They were a whiter variety resembling both the Globe and the Spanish. The same fault was apparent in these onions—namely, they were packed rather loose. It would be a great advantage to have the crates made the exact size to contain 100 lb. net, and care taken to fill each crate. Merchants complain that they are not getting the proper quantity of onions to the crate.

## APPLES.

Vancouver, 20th May, 1912.

A shipment of New Zealand apples arrived *via* San Francisco. Varieties were principally Jonathan, Cox's Orange, Sturmer, Monro's Favourite, Five Crowns, Rookwood, Russets, and Alfriston.

The fruit was inspected very thoroughly by the Provincial Fruit Inspectors, and only a few boxes were condemned on account of pests. The fruit arrived in very good condition, and was well wrapped in tissue paper. Greater care must be given to the question of grading, as many boxes which were marked 2½ in. or 3 in. contained quite a percentage of smaller apples, which detracts from the appearance when the fruit is opened up and thereby from the price. Grading-machines similar to those used in the best fruit sections of the United States could be used to advantage.

It is absolutely necessary to have cases clearly and distinctively marked in the following manner by the exporters of fruit for this market. For example:—

Jonathan.                      Size 2½".  
Grade A.  
JOHN SMITH  
WESTBURN ORCHARD  
NEW ZEALAND.

Quite a number of growers were represented in the shipment, and each individual had a different idea and method of marking his boxes. Some gave the district where the fruit was grown, variety of apple and size and grade; others marked their own name on the box, but forgot the variety of apple or size. A little more attention along these lines will be appreciated by the importers, and tend to create a market for New Zealand apples in British Columbia.

## THE WOOL MARKET.

London, 2nd July, 1912.

The wool sales have commenced. Despite the strike, a full catalogue has been shown to-day. There is a large attendance of Home, Continental, and several American buyers. Competition is very animated, and prospects are favourable. Merino wool ½d. per lb., medium crossbreds ½d. fine crossbreds ¾d., and coarse crossbreds ¾d. higher than the closing rates of last sale. 152,000 bales of New Zealand wools are catalogued. The estimated value of New Zealand wools at the close of the second series of Colonial wool sales in London on the 4th May, 1912, were as follows: Superior merino 1s. to 1s. 1½d. per lb., medium 9½d. to 11½d., inferior 7½d. to 9d., fine crossbreds, all grades, 11d. to 1s. 1½d., medium crossbreds 8½d. to 11d., coarse crossbreds 7½d. to 10½d.—*High Commissioner's Report.*

## THE BACON TRADE.

It is contended that there is an encouraging prospect of a very large trade in Australian bacon for the English market, provided that the taste of the consumer be correctly gauged. In connection with this it is pleasing to note that Mr. Joseph E. Prossar, a bacon-curing expert with a European reputation, has arrived in Sydney, under contract with the Government to give tuition at the Hawkesbury College. He states that Australian pigs are as good as need be for the production of the finest quality of bacon on the London market. Mr. Prossar referred to the prices of bacon. He pointed to

the latest quotation of Irish "lean sizable" at 69s., 67s., and 64s., "stout sizable" being quoted at similar figures; fatter selections were a little less and down to 62s. Danish corresponding prices were 65s., 64s., and 63s. The margin between these bacons and the Australian produce ranged from 4s. to 14s., the former being in time of scarcity.—*New Zealand Government Agent at Sydney.*

## AUSTRALIAN MEAT TRADE.

As a result of representations made to the State Government the Cabinet concurred in a proposed change in the system of control in the meat trade. It was decided that all questions regarding abattoirs, saleyards, and meat-markets—in fact, the whole handling of stock from the time it leaves the train until it reaches the butchers' shops or the ships' holds—shall be under one control. It is probable that the Chief Secretary will at an early date make the necessary arrangements for the placing of the whole of this business under a special commission.—*New Zealand Government Agent at Sydney.*

## CHINA AS A MARKET.

THE great scope which China offers as a market was well illustrated in a recent article which appeared in the London *Financier*. It is shown that the yearly importations into China amount to not less than £80,000,000, a large sum actually, but representing less than 5s. per head of the population of 400,000,000. If China became an import market only on the same relative basis as Japan, its annual buyings would amount to as much as £400,000,000, or about £25,000,000 more than those of the United Kingdom last year, although at present Great Britain heads the world as an importer. If China actually reached the British and Australian import standard, the value of merchandise landed yearly at Chinese ports would amount to the huge sum of £4,800,000,000, or more than the entire trade of the world at the present time. Such a figure is, of course, altogether outside the scope of practical commercial politics for many years to come, but it is distinctly within the scope of China's potentialities, when the character of its population is taken into consideration.

New freezing-works at San Julian, Rio Gallegos, have commenced work. This concern will only deal with sheep.—*N.Z. Correspondent, Buenos Aires.*

For the first time in the history of the frozen-meat trade, a special train was despatched on the night of Wednesday, 8th instant, from London *via* Folkestone and Boulogne for Rome and Naples, conveying 45 tons of Australian meat. Hitherto the trade has been done by boat to Naples and Genoa. The train was composed of refrigerator-vans.—*Meat Trades Journal.*

It appears that Congress has sanctioned the project for the granting of a bounty to the first freezing-works erected in the Province of Entre Rios for the export of frozen meat. The bounty is not to exceed £6,666 in any one year, and will be given for a period of five years. In exchange for the bounty the Government will be given deferred shares, and these are to be redeemed when the works pay a 6-per-cent. dividend, the balance after the payment of this dividend to go to the redemption of the shares.—*New Zealand Correspondent, Buenos Aires.*

A memorandum by Mr. Cooke, Commercial Attache to H.M. Embassy at St. Petersburg, states that, according to the official *Commercial Gazette* of St. Petersburg of the 14th February, the export of butter from Siberia in 1912, as estimated by the conference of exporters meeting at Omsk on the 28th and 29th January, will be about 72,400 tons, or 5 per cent. increase over the export in 1911. It is also estimated that about 82 per cent. of this total will be exported during the summer season.

## BRITISH DAIRY-PRODUCE IMPORTS.

THE following statement shows the imports in tons weight of butter and cheese imported into the United Kingdom during the years 1909, 1910, and 1911 :—

BUTTER.				
	1909.	1910.	1911.	
	Tons.	Tons.	Tons.	
Russia .. ..	30,085	29,202	31,914	
Sweden .. ..	15,607	17,784	18,017	
Denmark .. ..	88,201	86,304	85,358	
Holland .. ..	7,428	7,726	5,232	
France .. ..	20,665	18,062	8,554	
United States ..	34	37	1,165	
Argentine .. ..	3,677	3,297	1,210	
Australia .. ..	19,230	31,954	43,719	
New Zealand ..	13,929	18,133	13,822	
Canada .. ..	1,126	840	3,096	
Other countries ..	3,154	3,433	3,054	

CHEESE.				
Holland .. ..	14,266	11,591	10,395	
Italy .. ..	3,861	4,263	3,757	
United States ..	2,730	1,912	7,516	
Australia .. ..	29	185	630	
New Zealand ..	18,426	22,689	19,892	
Canada .. ..	78,327	80,353	73,663	
Other countries ..	1,862	1,821	1,560	

## CANADIAN BUTTER TRADE.

THE following figures, giving the imports of butter into Canada for the year ending 31st March, 1912, show that the Dominion imported butter to the value of £203,282, of which New Zealand supplies represented £113,834 :—

From	General Tariff.		Preferential Tariff.	
	Weight.	Value.	Weight.	Value.
	lb.	£	lb.	£
Great Britain .. ..	37,182	2,118	663,718	38,125
United States .. ..	929,318	44,768	..	..
Australia .. ..	101,640	4,328	..	..
New Zealand .. ..	158,928	8,500	1,981,016	105,334
Other Countries .. ..	2,785	109	..	..
	<u>1,229,853</u>	<u>59,823</u>	<u>2,644,734</u>	<u>143,459</u>

It will be seen that a considerable quantity of New Zealand butter failed to secure preferential treatment, evidently owing to the fact that the goods were not invoiced on the special forms provided by the Canadian Customs authorities, the use of which is necessary if the advantages of the preferential tariff are to be secured.

## ANSWERS TO CORRESPONDENTS.

## CHICORY.

MR. CHAS. W. ZIELE, Christchurch, writes,—

I am reading Robert H. Elliot's "Clifton Park System of Farming, 1908," in which he strongly recommends including 4 lb. chicory in any grass mixture, especially in sowing down lands deficient in humus, but in the Annual Report of your Department for 1909, page 272, chicory is referred to as a weed. On page 48 Elliot says, "The advantages of chicory in pastures are very great, and there are no disadvantages." I have never seen chicory growing, so would value a few remarks from you in the next month's *Journal*.

The Director of the Fields and Experimental Farms Division replies,—

This plant has not been grown to any extent in New Zealand. At Ruakura Farm of Instruction chicory was sown with the grass-seed in laying down a paddock. It grew very vigorously. Stock ate it equally with the grass. It is deep-rooted and fairly permanent, and it was present in the pasture for at least six years. The land is now ploughed for cropping. There does not appear to be any great advantage to be derived by the addition of chicory to the grass of a pasture. It certainly adds to the variety. If hay is made the leaves require more weathering than grass. This must be allowed for. Mr. Elliot makes use of chicory and other deep-rooted plants for a special method of farming. If you are proposing to adopt it, then, no doubt, it will be well to use the plant. He uses 3 lb. per acre. One-half of this would suffice for experiment.

## ENSILAGE.

MR. E. H. HAMMOND, Tamahere, writes,—

Would you inform me if it is within your knowledge that ensilage has been held responsible for abortion in cows.

What is the best method of feeding it to cows when hay is also available?

The Live-stock and Meat Division replies,—

No, it has never been thought ensilage, if properly made, has been a cause of abortion.

Inspector Dibble, of the Fields and Experimental Farms Division, replies,—

To supply a dairy of cows during late winter and early spring months, it is advisable to give the herd a liberal supply of ensilage in the morning and hay in the evening; in fact, good hay is essential to keep the cow in good form during the early spring months, on account of the quick growth of grass and the frequent cold showers. It should also assure a higher test. If the inquirer is carrying on a dairy, that can be handled without entailing much labour, good ensilage may be mixed with lucerne or any other kind of hay and put through the chaff-cutter. Of course the better the material the better the result should be, especially if conveniences are provided so that each animal may get its proper allowance, say from 30 lb. to 50 lb. daily. If the ensilage is of first-class quality aged cows will eat a much larger quantity than the above weight mentioned."

## A BREEDING QUERY.

MR. F. BRADLEY, Cromwell, writes,—

What is the best way to tell whether a cow or heifer is in calf? I have two which went to the bull five or six times without result during the past three months, and I have not noticed either of them in season. If not in calf I would sell them.



### The Live-stock and Meat Division replies,—

The only thing to guide you in such a short time after service is the absence of œstrum recurring at regular periods.

### PEAS.

“PEAS,” Makotuku, writes,—

Would you kindly answer the following questions in your next *Journal* :—

1. I have a paddock that has been cropped with oats three or four years in succession, but has been in grass the last two years. The soil is a fairly stiff loam, of fair depth, on a clayey subsoil. I am thinking of putting it in peas. Do you think they would do all right ?

2. What cultivation would be necessary ?

3. How much seed to the acre ?

4. What are the best fertilizers to use ?

5. I have a lot of ground lime left from last year which has been kept perfectly dry in bags. Is it still good ?

### The Director of the Fields and Experimental Farms Division replies,—

1. Peas should grow well on the soil described, provided it is well drained. The most suitable soil for this crop is a loam on a calcareous formation. 2. Cultivate as for an ordinary crop. Peas reciprocate to a thorough preparation. The land should be fairly free from weeds. The horse-hoe will be found useful. 3. Two bushels, drilled.

### The Chief Agricultural Chemist replies,—

4. Would advise  $\frac{3}{4}$  cwt. superphosphate,  $\frac{1}{4}$  cwt. sulphate of potash,  $\frac{1}{2}$  cwt. blood and bonedust per acre.

5. The lime cannot have suffered much change in composition or it would have burnt the bags.

### GRASS AND TURNIPS.

“INTERESTED,” Featherston, writes,—

Could you give me any help in the following matters :—

1. A paddock here was sown down in grass—cocksfoot, rye-grass, and clovers—with oats. The oats were eaten off, and the grass came away well until the autumn, when it started to die off. The grass seems to be alive, but the tops are completely burnt off. The land is light on clay and gravel. The land has always grown grass poorly since it was first ploughed. It is to be top-dressed with basic slag at the rate of 3 cwt. to the acre. Could you tell me what is wrong ?

2. Is it safe to plant turnips twice in the same paddock ? It has turnips in now, and the owner is thinking of putting them in again. What do you recommend ?

### The Fields and Experimental Farms Division replies,—

1. Further data are required. There is no indication of the cause, except that such soils are quickly influenced by the absence of moisture.

2. It is certainly undesirable to take crops of turnips following each other from the same land, and particularly so if it has been in crop before. There may be no harm if it is the first time the land has been broken up.

### TUBERCULOSIS IN CATTLE.

MR. A. J. C. MACDONALD, Remuera, Auckland, writes,—

Could you inform me through the medium of the *Journal* if there is any simple method of detecting tuberculosis in cattle ?

### The Live-stock and Meat Division replies,—

There is no simple method by which the unskilled observer can detect the disease. Tuberculosis affects so many organs and glands of the body, often individually ;

and the symptoms shown are so varied and liable to be confounded with those of other diseases that its detection calls for considerable skill in diagnosis. In many cases even professional men cannot rely upon clinical examination alone, and have to fall back upon the tuberculin test. The application of this test is by no means so simple as it looks; and if the man applying it has not a thorough knowledge of the conditions governing it, as well as expert knowledge of the disease, he is very liable to make grave mistakes. If you have any suspicion of an animal having the disease, notify the Stock Inspector in your district at once, and if other examination is necessary he will arrange for it. This notification to the Stock Inspector, moreover, is necessary in the case of diseased stock or stock suspected of being diseased (see section 23 of the Stock Act).

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#### FOXGLOVE.

MR. ALFRED MONEY, Weka Weka, Hokianga, writes,—

Which is the best means of destroying foxglove, and at what time of the year?

The Fields and Experimental Farms Division replies,—

Foxglove is an annual, and is a very free seeder. It is said that the seed is spread a good deal by being caught in the wool of sheep depasturing among it. The best plan is to pull the plant out of the ground before it comes to flower. This may appear a very big order where there is any extent of it, but it is probably as quick as and cheaper than spraying. The ground in either case has all to be gone over.

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#### PROTECTING APPLE-TREES AGAINST HARES.

W. R., Clive, Hawke's Bay, writes,—

Would you kindly advise me through the *Journal* whether you know of anything that I can put on young apple-trees to keep hares from barking them, and that would not be injurious to the tree. Some little time ago I read of a mixture (which included pulped fresh livers) but what it exactly was, or where I read it, I cannot remember.

The Director of Orchards, Gardens, and Apiaries replies,—

The most satisfactory way to protect young trees from injury by hares is by using guards made of wire netting such as are used for rabbit-fences, or better still fencing the orchard or garden so as to make it proof against hares or rabbits. Putrescent flesh or blood, painted on the trees has been recommended, but the efficacy of this treatment is only of limited duration. Moreover, in the case of young trees that have been cut back after planting, hares standing on their hind legs will reach up and nip off the young shoots and thus prevent the trees making growth.

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#### LUCERNE HAY.

T. O. M., Tai Tapu, writes,—

Kindly inform me whether lucerne hay fed in greater quantities to horses has an injurious effect on the action of the kidneys. I have been told it has. I may state that I have 5 acres in lucerne, from which I make hay. Last winter a mare (not in foal) died from what seemed to me to be stoppage of water. She had been receiving with oat-sheaf chaff some lucerne hay. Of course, the hay may not have had anything to do with the trouble. I did not think so at the time, but, as I have since been told that it acts injuriously, I have wondered if there was any connection. I have fed cows on it without seeing any ill effects, in fact, they did extremely well on it.

The Live-stock and Meat Division replies,—

We have never heard of lucerne hay, when properly made, being injurious to horses fed upon it. If, however, the hay has been badly saved or overheated in the stack, it might then be injurious. Badly "mow-burned" hay of any kind acts as a diuretic, causing thirst and loss of condition. Your mare evidently died from some bowel trouble, probably impaction, and I would sooner blame the oat chaff than the lucerne hay, if this condition was really the cause of death.

SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM.  
COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcasses.	Lamb, Carcasses.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bals.	Kauri- gum, Cases.	Sundry.
January, 1911	237,284	302,399	12,424	114,512	64,005	95,994	..	.. 16	7,295	6,365	1,942	3,407	59 carcasses pork. 590
" 1911	175,337	287,120	13,568	90,405	46,375	127,199	..	..	399	15,234	3,302	7,094	"
February, 1912	208,424	273,246	13,052	101,544	62,398	106,074	607	.. 200	..	6,831	1,615	1,056	1,369 carcasses pork.
" 1911	242,090	450,406	24,924	86,368	46,667	70,030	23,694	..	..	4,428	1,302	2,113	"
March, 1912	324,192	518,402	20,201	64,925	49,308	70,022	..	4,980	..	3,832	1,352	2,644	16 carcasses pork.
" 1911	264,297	663,822	26,657	45,912	40,668	58,362	40,276	..	..	3,650	1,563	8,982	"
April, 1912	213,178	355,899	7,046	38,986	38,137	31,615	4,905	2,180	..	5,134	1,958	4,458	2,431 carcasses pork.
" 1911	172,503	491,413	19,106	14,823	33,411	42,217	38,456	6	..	9,233	1,837	2,577	"
May, 1912	454,506	744,287	32,691	1,441	40,535	51,833	11,157	26,560	1,500	11,963	2,826	6,287	1,087 carcasses pork.
" 1911	204,390	377,105	20,173	995	20,732	33,033	93,834	..	..	7,443	1,210	7,720	"
June, 1912	170,738	287,697	24,693	558	7,712	18,138	9,160	7,022	2,039	5,616	1,168	1,213	221 carcasses pork.
" 1911	214,079	448,432	15,789	..	6,323	19,568	30,422	..	14,128	4,763	555	3,525	"
July, 1911	206,869	240,761	14,296	..	276	14,100	29,452	..	10,334	6,022	1,073	2,786	175 carcasses pork.
" 1910	249,906	334,753	71,160	..	595	12,816	20,694	1,106	8,649	6,695	1,437	8,272	"
August, 1911	66,608	110,054	3,653	..	..	5,260	31,976	..	18,231	3,443	303	3,475	203 carcasses pork.
" 1910	94,468	97,899	16,110	634	..	5,361	33,970	273	22,629	1,378	720	6,793	"
September, 1911	102,081	40,057	6,059	6,404	..	7,390	33,171	..	33,059	5,604	393	7,672	220 carcasses pork.
" 1910	104,925	26,416	8,420	22,614	41	6,539	40,876	3,863	7,721	2,680	597	1,682	"
October, 1911	9,417	2,043	100	49,626	11,501	2,182	..	..	32,094	4,514	754	2,982	56 carcasses pork.
" 1910	49,010	800	10,531	61,014	9,459	3,189	94,815	23,330	36,917	3,632	1,232	3,089	"
November, 1911	47,770	10,427	403	135,741	57,319	44,034	15,833	..	16,606	7,844	2,183	3,085	911 carcasses pork.
" 1910	62,926	29,877	5,554	105,759	27,719	55,551	76,594	331	25,646	6,850	2,300	4,339	"
December, 1911	72,192	91,965	765	109,397	46,883	54,297	..	..	4,366	5,719	1,364	2,708	686 carcasses pork.
" 1910	82,405	137,172	13,155	182,051	67,162	59,080	..	..	9,716	4,524	109	5,363	"

## HEMP AND TOW GRADING RETURNS.

JUNE, 1912.

*Hemp.*—The total number of bales graded was 6,092, as compared with 5,265 bales for the corresponding month of last year, an increase of 827 bales. For the twelve months ending 30th June, 1912, the number of bales graded was 91,356 as compared with 97,749 for the previous twelve months, the decrease being 6,393 bales.

*Tow.*—During the month 1,594 bales were dealt with, as compared with 1,369 for the corresponding month of last year, an increase of 225 bales. For the twelve months ending 30th June, 1912, the number of bales graded was 25,080, as against 30,212 for the previous twelve months, the decrease being 5,132 bales.

## HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF JUNE, 1912.

*Hemp.*

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	134	841	114	112	6	1,207
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	11	721	1,518	42	4	..	2,296
Wellington ..	..	16	1,019	790	29	6	..	1,860
Blenheim ..	..	..	..	..	..	..	..	..
Pictou ..	..	60	176	..	..	..	..	236
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	85	28	5	..	..	..	118
Bluff ..	..	..	58	315	2	..	..	375
Totals ..	..	172	2,136	3,469	187	122	6	6,092
Percentages of totals	..	2.82	35.06	56.94	3.08	2.00	0.10	100

*Tow.*

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	172	58	..	230
Napier ..	..	..	..	..	..
Foxton ..	202	220	58	..	480
Wellington ..	353	237	38	40	668
Blenheim ..	..	..	..	..	..
Pictou ..	28	..	81	..	109
Lyttelton ..	..	..	..	..	..
Dunedin ..	..	22	..	..	22
Bluff ..	..	53	32	..	85
Totals ..	583	704	267	40	1,594

*Stripper-ships.*—Wellington, passed for shipment 204, condemned 5: total 209. Foxton, passed for shipment 134: total 134.

## STOCK EXPORTED.

JUNE, 1912.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.		Sheep.			Swine.
	To Australia.	To Pacific Islands.	To Singapore.	To Australia.	To Pacific Islands.	To Australia.	To Pacific Islands.	To India.	To Pacific Islands.
Auckland .. ..	10	20	..	..	43	..	202	..	74
Gisborne .. ..	..	..	..	..	..	2	..	..	..
Napier .. ..	..	..	..	..	..	..	..	..	..
Wellington .. ..	13	..	..	..	..	11	..	..	..
Lyttelton .. ..	27	..	..	..	..	755	..	..	..
Timaru .. ..	..	..	..	..	..	163	..	..	..
Dunedin .. ..	55	..	..	..	..	76	..	..	..
Bluff .. ..	29	..	..	..	..	..	..	..	..
Totals .. ..	134	20	..	..	43	1,007	202	..	74

Following are particulars of the horses shipped : 106 draughts (78 stallions, 15 mares 1 gelding, 7 colts, 5 fillies), 8 medium draughts (3 mares, 5 geldings), 23 thoroughbreds (5 stallions, 11 mares, 6 geldings, 1 foal), 9 light horses (6 mares, 3 geldings), 3 trotting-horses (1 stallion, 2 geldings), 5 pony mares.

## PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of June, 1912, of agricultural and farm products :—

Item.	Quantity.	Value.
		£
Bran .. ..	tons	..
Butter .. ..	cwt.	..
Cheese .. ..	cwt.	2
Chaff .. ..	1 ton	11
Fruits, fresh, all kinds ..	1,079,739 lb.	7,286
Barley .. ..	8 centals	10
Oats .. ..	41 centals	35
Wheat .. ..	centals	..
Onions .. ..	cwt.	..
Pollard and sharps .. ..	tons	..
Potatoes .. ..	1 ton	6
Seeds, grass and clover ..	1,314 cwt.	5,572
Total values imported ..	..	£12,922



## WEST CANADIAN MARKETS.

## NEW ZEALAND - VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American Ports from New Zealand since March last :—

	"Marama," 12th April.	"Makura," 14th May.	"Zealandia," 10th June.	"Marama," 5th July.	Totals.
Butter, boxes ..	3,300	1,510	80	1,600	6,490
Lamb, carcasses ..	10	..	..	..	10
Mutton, " ..	30	..	..	..	30
Veal, " ..	27	52	..	..	79
Beef, quarters ..	6	8	40	..	54
Beef, boned, bags ..	10	259	605	..	874
Frozen sundries, packages	11	7	8	4	30
Wool, bales ..	10	178	27	9	224
Pelts, casks ..	5	..	..	..	5
Grass - seeds, beans, &c., sacks ..	383	..	260	21	664
Hides and skins, sacks, &c.	217	419	344	861	1,841
Onions, cases ..	2,429	350	2	..	2,781
Sheep-skins, bales ..	..	45	35	..	80
Jam, cases ..	..	150	..	..	150
Sundries, packages ..	4	46	111	110	271
Potatoes, crates ..	..	..	17	..	17

## WEST AMERICAN AND ISLAND MARKETS.

## NEW ZEALAND - SAN FRANCISCO SUBSIDIZED STEAM SERVICES.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti from New Zealand since March last :—

	"Aorangi," 26th April.	"Tahiti," 24th May.	"Manuka," 21st June.	Total.
Gum, packages ..	15	7	24	46
Seeds, sacks ..	37	88	340	465
Grain, &c. ..	86	73	46	205
Meats, cases ..	71	140	153	364
Onions, cases and sacks ..	5	1	2	25
Potatoes ..	27	48	37	112
Timber, bundles ..	..	500	..	500
Sundries, packages ..	69	73	92	234
Butter, boxes ..	802	2	2	806
Apples, cases ..	100	6	..	106

The s.s. "Arawa," which sailed from Wellington for London on the 13th June, took the following cargo for South American ports : From Hobart : for Rio de Janeiro, 7,450 cases of apples ; for Monte Video, 9,679 cases of apples. From Lyttelton : for Rio de Janeiro, 701 sacks of potatoes ; from Dunedin, 1,505 sacks of potatoes.

## ARGENTINE TRADE WITH BRITAIN.

THE Department has received the following cablegram from Buenos Aires, dated 4th July, 1912 :—

The following shipments of produce were despatched from the Argentine to United Kingdom ports during June, 1912 (compared with June, 1911) :—

	1912.	1911.
Frozen beef (quarters) .. .. .	184,000	119,000
Chilled beef (quarters) .. .. .	204,000	199,000
Frozen mutton (carcases) .. .. .	258,000	223,000
Frozen lamb (carcases) .. .. .	100,000	92,000
Butter (cwt.) .. .. .	Nil	Nil

## STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of June :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
1	Jersey	.. Bull	.. Liverpool..	R. Glynn Lewis	Okoroire.
1	"	.. Heifer	.. " ..	"	"
SOMES ISLAND (WELLINGTON).					
1	King Charles spaniel	Male	.. London	.. H. E. Troutbeck	.. Napier.
1	Ditto	.. Female	.. " ..	.. " ..	.. " ..
1	Pug dog	.. Male	.. " ..	Mrs. A. Dean	.. Whangamona.

In the month of March there were sixty-two outbreaks of foot-and-mouth disease in eight provinces of Holland.

Following are the imports from New Zealand into Victoria and the exports from that State to the Dominion during the quarter ending March last, compiled from Victorian official figures : From New Zealand to Victoria : Animals, living, £10,304 (91 geldings, 73 stallions, 145 mares, 184 sheep); grain, £13,391 (11,942 centals of barley, 142 centals of beans and peas, 22,358 centals of oats); rugs, £1,634; seeds, £7,683; skins and hides, £12,899 (7,236 cattle, 96 horse, 240 rabbit-skins, 549 sheep-skins without wool); timber, £39,323; total, £91,476. From Victoria to New Zealand : Animals, living, £1,691 (2 stud horses, 52 sheep); fruits, dried and preserved, £5,210; fruits, fresh, £2,161; flour, £2,081; leather, £4,185; manures, £2,904; bark, tanning, £4,314; onions, £757; hides and skins, £1,266; wine, bottled, £2,125; wine, in bulk, £1,035; wool, greasy, £2,206; total, £29,931.

## THE BRITISH PRODUCE-MARKET.

## HIGH COMMISSIONER'S CABLED REPORTS.

THE Department of Agriculture, Commerce, and Tourists has received the following cablegrams from the High Commissioner for New Zealand. (NOTE.—Quotations, unless otherwise specified, are average market prices on spot.)

London, 15th June, 1912.

*General*.—The strike is subsiding, many men are returning to work. Business is apparently improving.

*Mutton*.—The market is steady. Canterbury 4½d. per lb., North Island 4d.

*Lamb*.—The market is firm, but expect prices will decline when larger supplies become available. Canterbury 6½d. per lb., other than Canterbury 6¼d.

*Beef*.—The market is quiet, the supply exceeds the demand. New Zealand hinds 4½d. per lb., fores 3¾d.

*Butter*.—The market is quiet but steady. New Zealand holders are firm. Choicest New Zealand 115s. per cwt., Australian 108s., Danish 121s., Siberian 108s.

*Cheese*.—The market is firm, but demand only moderate. New Zealand coloured 74s. per cwt., white 72s. 6d.

*Hemp*.—The market is quiet but steady, and is dependent on Manila reports. Spot: New Zealand good-fair £22 per ton, fair grade £20 10s.; fair current Manila £22. Forward shipment about the same price. The output from Manila for the week was 31,000 bales.

*Wool*.—The market prospects are favourable. There is general confidence in the maintenance of present prices. Current quotations for Bradford tops: 36's, low cross-breds, 1s. 1¼d. per lb.; 40's, low cross-breds, 1s. 1½d.; 44's, medium cross-breds, 1s. 2¼d.; 50's, half-breds, 1s. 5½d.; 56's, quarter-breds, 1s. 7½d.; 60's, merinos, 2s. 1d.

*Wheat*.—The market is rather more active.

*Oats*.—The market is very quiet.

*Peas*.—There is less demand.

*Beans*.—The market is very dull.

London, 18th June, 1912.

*Eggs*.—The market is quiet, but moderate business doing. There is a better demand for cheaper sorts. Home 8s. 6d. to 9s. 6d. per 120, Austrian 6s. 9d. to 7s. 6d., Russian 6s. 9d. to 7s. 6d., Italian 8s. 3d. to 9s. 3d., French 9s. 6d. to 10s. 6d., Danish 8s. 3d. to 9s. 3d., Dutch 7s. 6d. to 10s.

*Poultry*.—The market is firm. A small supply. Chickens: Home 1s. to 1s. 3d. per lb., Russian 11d. to 1s. 1d. Ducklings: Home 9d. to 10d., Chinese 7d. to 7½d. Turkeys: Practically cleared.

*Bacon*.—The market has been unfavourably affected by the strike recently, but has been improving during the last week. The market is steady and holders are firm. Sides: Irish 67s. to 77s. per cwt., Danish 64s. to 73s., Canadian 58s. to 70s., Swedish 64s. to 70s., Russian 48s. to 64s.

*Hams*.—The market is quiet; a small business doing. The demand is chiefly for long cuts. Irish 85s. to 104s. per cwt., English 88s. to 104s., Canadian 76s. to 82s., American 59s. to 73s.

London, 22nd June, 1912.

*General*.—The strike is still unsettled, but business is normal. New Zealand steamers are discharging slowly, large shipments arriving.

*Mutton*.—The market is weak. Canterbury 4½d. per lb., North Island 3¾d.

*Lamb*.—The market is quiet. Shipments of lamb now arriving are very heavy. High prices are restricting business. Canterbury 6½d. per lb., other than Canterbury 6d.



*Beef.*—The market is dull. Supplies of American chilled beef are large. New Zealand hinds 4½d. per lb., fores 3½d. Average price for River Plate chilled (hinds) 4½d. per lb., fores 3½d.

*Butter.*—The market is weaker, and tendency downwards. Supplies are increasing. The weather continues favourable to increase the production Home and Continent. Choicest New Zealand is 113s. per cwt., Australian 107s., Danish 119s., Siberian 105s.

*Cheese.*—The market is a shade weaker. The Home make expected will be large. New Zealand coloured 72s. per cwt., white 71s., Canadian coloured 67s., white 66s., English Cheddar 90s.

*Hemp.*—The market is quiet, but moderate business doing. Spot: New Zealand good-fair grade £22 per ton, New Zealand fair grade £22 10s. (?), fair current Manila £22. Forward shipment: New Zealand good-fair £22 per ton New Zealand fair grade £20 15s., Manila £22 5s. The output from Manila for the week was 19,000 bales.

*Wool.*—The market is strong.

*Linseed.*—The market is weak and inactive. Bombay 68s. 6d. per quarter of 416 lb., Plate 64s., Calcutta 68s. per quarter of 410 lb.

*Hops.*—The market is slightly weaker, with less demand on account of the fine weather for the Home crop.

London, 29th June, 1912.

*Mutton.*—The market is weak and inactive, except for prime quality, light weight. Canterbury 4½d. per lb., North Island 3½d.

*Lamb.*—The market is quiet, but steady at last quotations, viz.: Canterbury 6½d. per lb., other than Canterbury 6d.

*Beef.*—The market is steady. There is a better demand for beef. New Zealand hinds 4½d. per lb., New Zealand fores 3½d.

*Butter.*—The market is quiet. There is a fair demand for better grades. Choicest New Zealand 113s. per cwt., Australian 106s., Danish 119s., Siberian 104s.

*Cheese.*—The market is quiet at the decline. Canadian shipments are increasing. New Zealand white 69s. per cwt., coloured 70s.

*Hemp.*—The market is quiet but steady. The market is dependent on Manila reports. Reports from Manila indicate large shipments, but the supply of fine quality is running short. No change in prices, viz.: Spot: New Zealand good-fair grade £22 per ton, fair grade £22 10s. (?), fair current Manila £22. Forward shipment: New Zealand good-fair £22 per ton., fair grade £20 15s., fair current Manila £22 5s. The output from Manila for the week was 42,000 bales.

*Wool.*—The market is firm. Great uncertainty exists on account of strike regarding the wool-sale next Tuesday.

London, 6th July, 1912.

*General.*—The strike continues. Meat is still being delivered at the market under police protection.

*Mutton.*—There has been more inclination to purchase mutton during the past week, especially light-weights. Canterbury 4½d. per lb., North Island 3½d.

*Lamb.*—The market is firm for anything available, but high prices are restricting business in the market. Canterbury 6½d. per lb., other than Canterbury 6d.

*Beef.*—The market is firm. A moderate supply. There is a general and active demand. New Zealand hinds 4½d. per lb., fores 3½d.

*Butter.*—The market is quiet, with a tendency in favour of buyers; but holders are firm for New Zealand best quality. Choicest New Zealand 113s. per cwt., Australian 106s., Danish 119s., Siberian 103s.

*Cheese.*—The market is rather quiet. The Home make is large. Expect prices will decline. New Zealand white 69s. per cwt., coloured 70s., Canadian white 64s., coloured 65s.

*Hemp.*—The market is firmer, and there is a better demand. Spot—New Zealand good-fair grade £22 5s. per ton, New Zealand fair grade £20 15s., fair current Manila £22 10s. Forward shipment, about the same price. The output from Manila for the week was 20,000 bales.

*Wool.*—The market is strong. All stocks are advancing. Current quotations for Bradford tops: 36's, low crossbreds, 1s. 1½d. per lb; 40's, low crossbreds, 1s. 1½d.; 44's, medium crossbreds, 1s. 2½d.; 50's, halfbreds, 1s. 6d.; 56's, quarterbreds, 1s. 8½d.; 60's, merino, 2s. 2d.